FOOD ENGINEERING

July 1952

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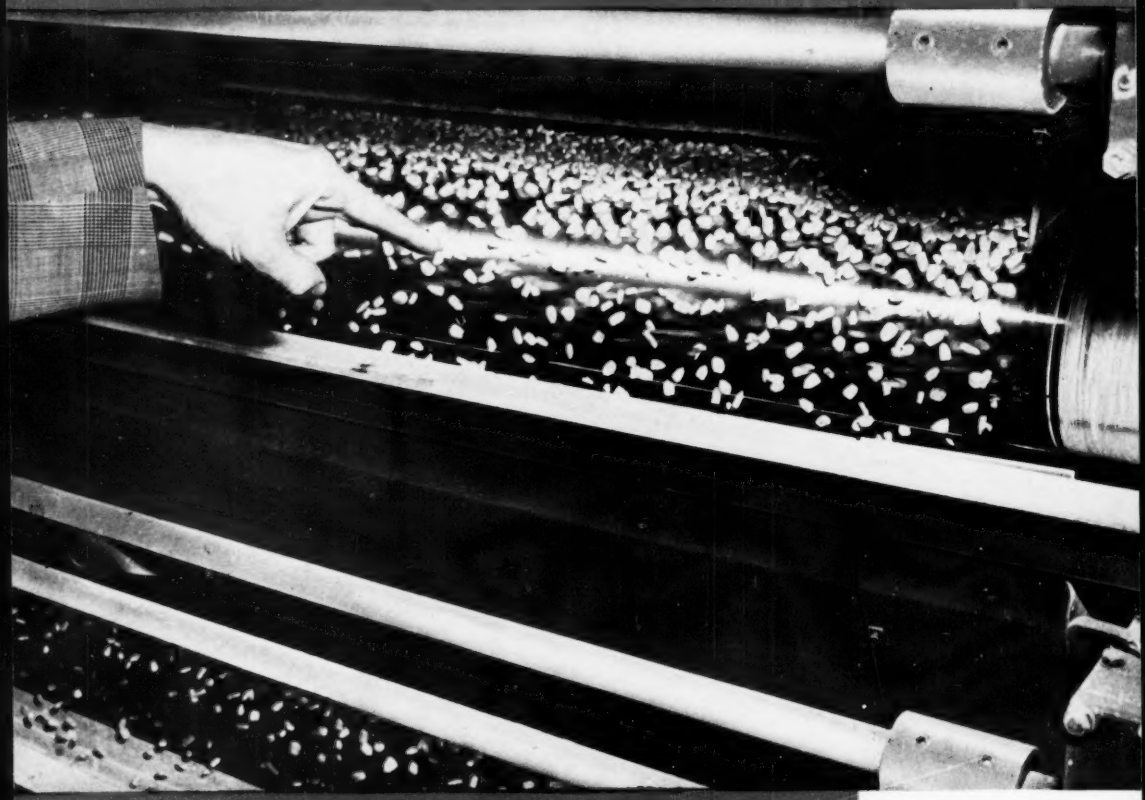

30,000-VOLT electrostatic roll kicks foreign particles out of grain in revolutionary Quaker Oats process. Page 53

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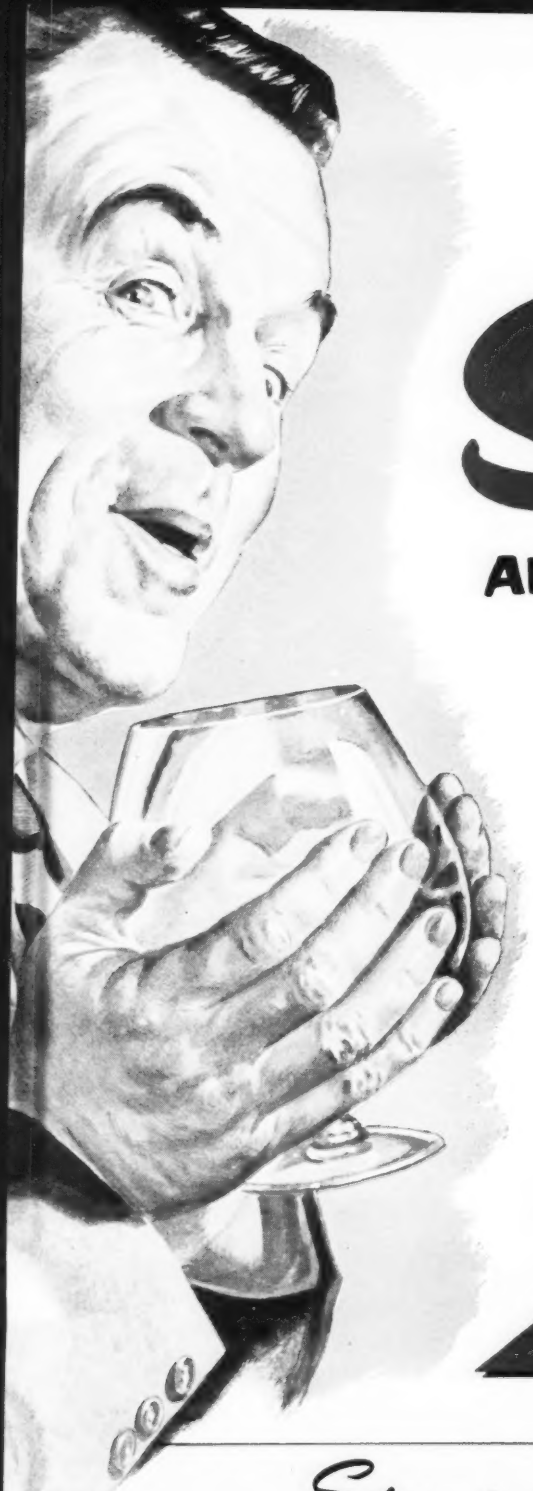

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MAINTENANCE COSTS ARE LOW for users of Allis-Chalmers Totally-Enclosed, Fan-Cooled Motors. They are easy to clean because even the stickiest dirt can be wiped or blown off without dismantling the motor or even stopping it. They seldom require cleaning because cooling air flows over the *outside* of the motor. There are no external concealed air passages to clog up and cause over-heating. You get better operational continuity, lower maintenance.

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Double-shielded ball bearings require no regular maintenance under most normal operating conditions. Yet if difficult service makes re-lubrication desirable, it can be done without dismantling the motor or bearings. Rigid cast iron frame and stiff end brackets maintain bearing alignment . . . assure maximum bearing life.

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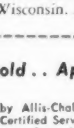

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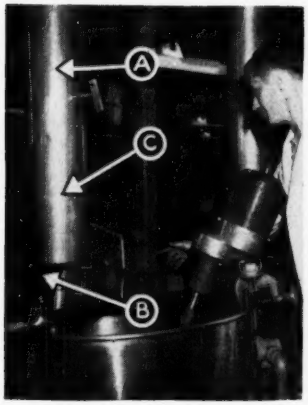
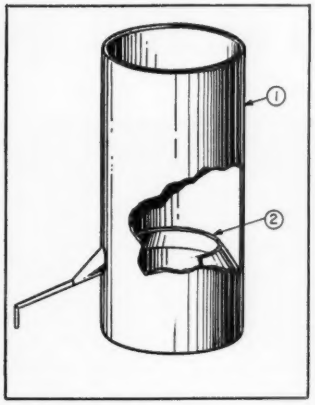
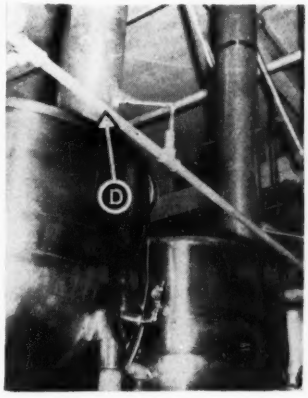
PRACTICAL IDEAS







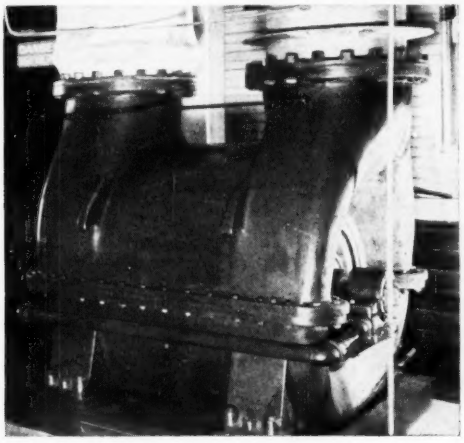
Efficient Condensate Control System

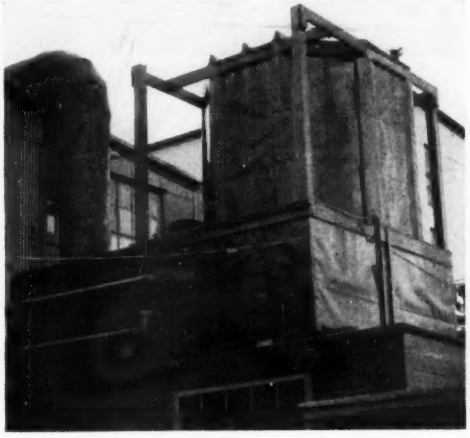
By separately venting each of our jacketed kettles for removal of vapor, and also by installing on each vent a specially designed condensate trap and drain, we have accomplished these objectives:

1. Removed all condensable evaporation vapors from the plant.
2. Avoided usual winter-month heat losses, which result when a conventional open type manifolded hood is used.
3. Prevented any condensed vapor from returning to the product or dripping on the floors surrounding the kettles.
4. Achieved an improvement in kettle room sanitation.

Vent pipes—(A) in left photo—are suspended from the plant roof to within approximately 10 in. of the 3-in. collars (B) on kettle lids. The space between is spanned by a sleeve (C) fitted around the outside of pipe and collar. This sleeve can be raised and removed for access to the vent or for cleaning.

Inside the removable sleeve—(1) in sketch—is located the condensed-vapor trap (2), a V-shaped trough welded to the inner surface. The spout drains collected condensates into stand-pipes along a drain—(D) in right photo—leading to the sewer.—*Robert Korn, Plant Engineer, Henry I. Henry Inc., Buffalo.*





Insulation Ends Noise Complaint

We have silenced the shrill whine of our big turbo-blower by capping the intake with an inverted insulated cup and covering the outlet pipe with a glass fiber.

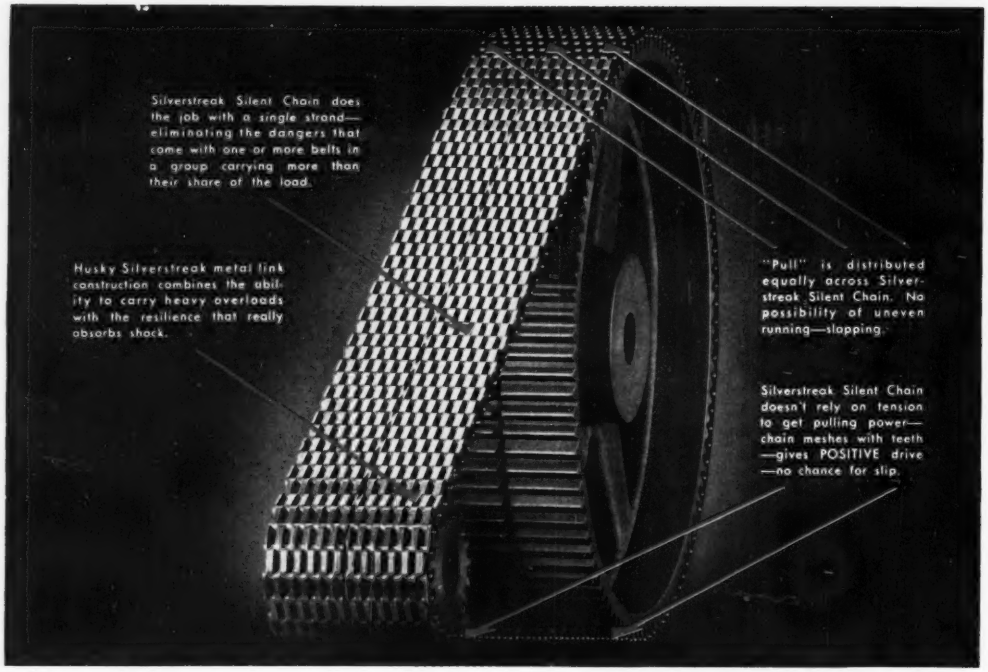
The blower (left photo) is a 4,150 rpm., 18,000 cfm. unit. It is driven, through a step-up-gear by a 1,800 rpm., 700 hp., GE motor.

When first installed, the high-pitched "voice" irritated workers. However, within two weeks time they were completely adjusted to the sound. But not so, our near-by neighbors—who found the whine continuously annoying. The noise had to be silenced.

Here are the several simple steps taken and the results obtained from each:

At the suggestion of Ingersoll-Rand engineers, the intake

Here's the proved way to transmit high hp at high speeds...


Silverstreak Silent Chain does the job with a single strand—eliminating the dangers that come with one or more belts in a group carrying more than their share of the load.
Husky Silverstreak metal link construction combines the ability to carry heavy overloads with the resilience that really absorbs shock.
"Pull" is distributed equally across Silverstreak Silent Chain. No possibility of uneven running—slapping.
Silverstreak Silent Chain doesn't rely on tension to get pulling power—chain meshes with teeth—gives POSITIVE drive—no chance for slip.

Link-Belt Silverstreak Silent Chain drives are slip-proof...slap-proof...shock-proof

ON thousands of applications . . . under all types of operating conditions—Link-Belt Silverstreak Silent Chain Drives have proved their effectiveness and durability. High horsepowers and high speeds are delivered with the same trouble-free efficiency (over 98 per cent) as on less demanding loads. There's a power-transmission engineer in the Link-Belt office near you.

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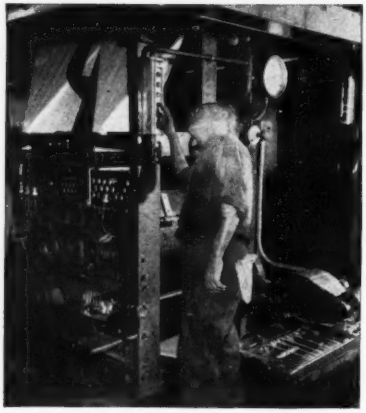


As it has since 1940, a touch of the control button brings exact press speeds at the New York Herald Tribune. In those 12 years, there has been no replacement required on the two 100 hp Silverstreak Silent Chain Drives that power this press at chain speeds up to 3664 fpm.

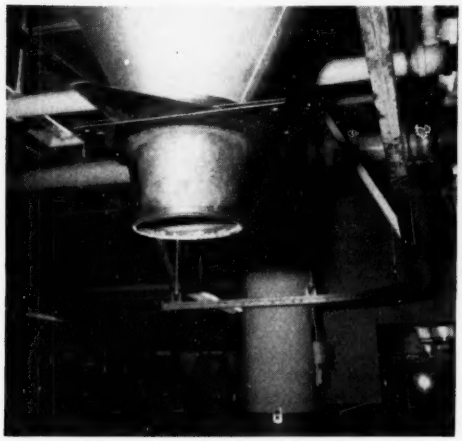
For more information, use post card on last page.

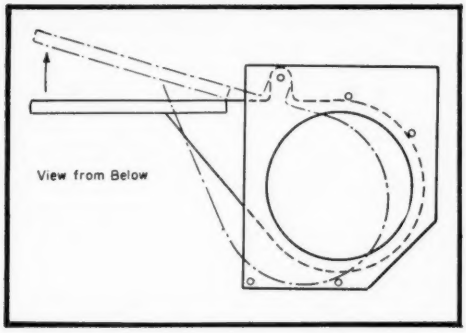
pipe, which extended above the plant roof, was first surrounded by an eight-sided wood frame (right photo) made of sheathing on two-by-fours and covered on the outside by roofing paper.

Attached on the inside, between the two-by-four uprights and the top cross members, was a 4 in. layer of glass-wool insulation.

When the insulated cap was added, most of the nuisance sound was absorbed. However, silencing of the assembly was not complete until the 80 ft.-long exhaust pipe, extending over the plant roof to the fermenters, was likewise insulated with 4 in. of glass wool and also covered with roofing paper.

Now the turbo-blower's operation is entirely unobjectionable to our neighbors.—*Karl Schnorr, Plant Engineer, National Yeast Corp., Belleville, N. J.*



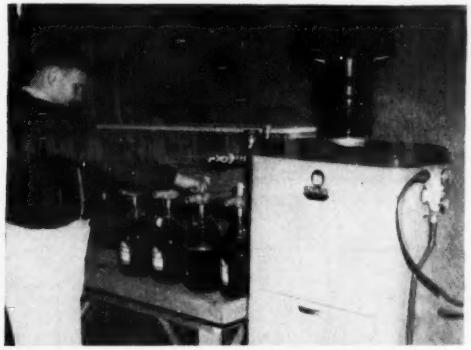


Improves Hopper-Discharge Valve

Replacing the conventional hopper-discharge slide-valve, which moves in a straight line, with a pivoted valve which moves in an arc not only speeds delivery from a hopper and reduces spillage but also proves more convenient for the operator at our plant to manipulate and control.

Located above working space, the hopper outlet (see photo) is elevated high enough above the floor to permit worker traffic beneath it. At this height, however, it is difficult for an operator to control accurately the movement of a push-pull slide valve—especially so, since the valve must be operated while a large mobile tub is underneath the outlet.

Installation of a pivoted slide valve operated by a long arm (sketch) not only provides adequate control over the discharge and cut-off, but also proves convenient for the worker to operate.—*D. B. Bradshaw, Plant Engineer, A. H. Johnson Co., Boston.*



Water Heater Serves Dual Purpose

Applying Yankee ingenuity, Fabian Johnson Cider Mill, New Milford, Conn., has piped-in a water heater to efficiently pasteurize apple cider, and also provide hot water for plant use. And the cost was only about $500.

Fresh cider enters the water heater (fired by bottled LP-gas) at a temperature of 60 deg. F., and at the rate of 2 gal. per min. it is flash pasteurized to 180 deg. F.

When the day's processing is completed, a switch of valves sends water through the heater to clean it and provide hot water for plant washing.—*F. E. Staff.*

$50 Extra for Best Item

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get an additional payment of $50.

Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

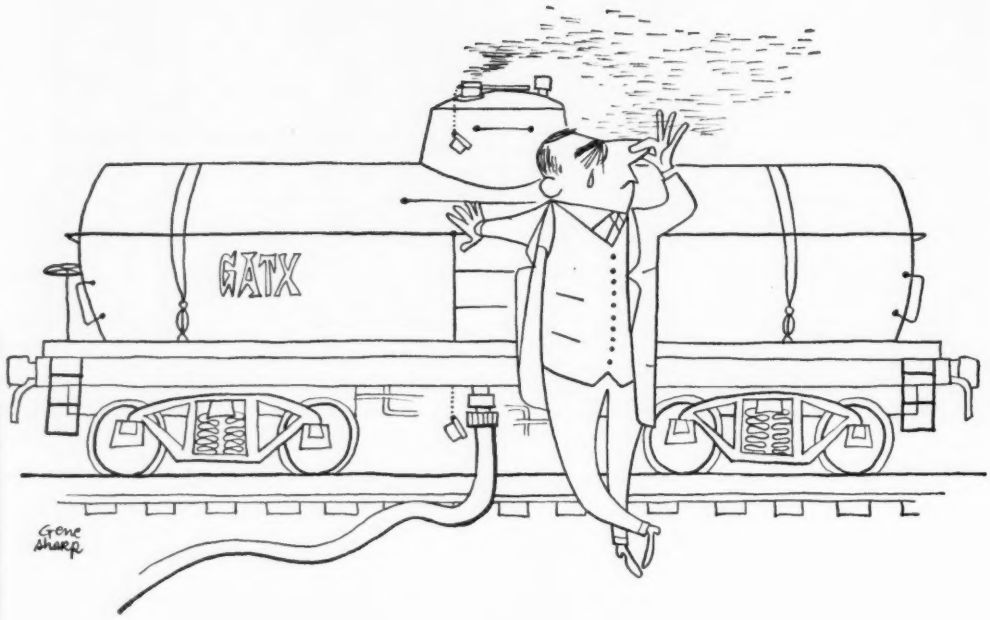
Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

MAY PRACTICAL IDEA voted best was "Two Twists That Prevent Flour Waste," submitted by Herbert D. Bahrenburg, Plant Engineer, Maltex Co., Burlington, Vt. Described was a method of controlling dusting-flour feed at dough rolls, also a means of recovering flour for re-use by angled sweeping, sifting, and conveying to feed hopper.

THE CARE AND NURSING OF TANK CARS



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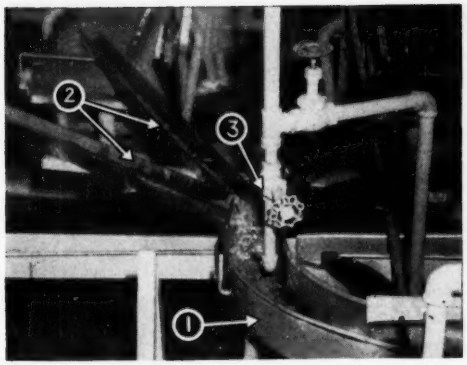
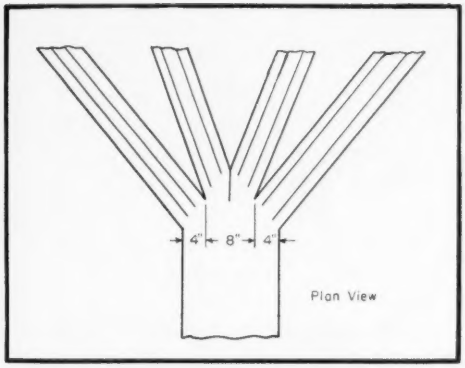




Four Equal Streams From One Flume

We now get delivery of a uniform amount of cut beans and other water transported products from a single main flume serving each of four inspection conveyors.

What we did was add a flume section divided into four channels, properly baffled at the forking point. And we also increased the water flow of the main flume at the proper location ahead of the dividing point.

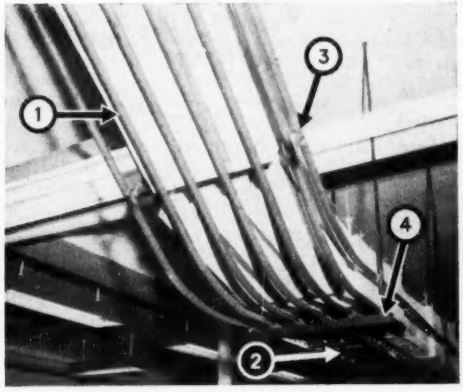
The problem, which arose when it became necessary to deliver a uniform amount of material to four production lines instead of one, was solved in this manner:

The main flume—(1) in photo—is approximately 8 in. wide and flat bottomed. It was divided at a junction point into four V-shaped flume sections (2) approximately 2 in. wide at the bottom. These fan out with equal angles between, so as to deliver their cargoes to four wire-belt water-separator conveyors, which in turn supply four inspection belts.

Separators are driven by the inspection-belt motors. Uniform distribution is controlled by baffles (see sketch) placed at the junction of the flumes.

This arrangement gave us our equal distribution of material between the four branch flumes. However, if the water flow of the feed flume fell below a certain rate, material piled up at the junction.

By installing a valve-regulated water outlet (3) above the junction point, to increase the volume of water and speed of flow, this condition was corrected. This outlet is placed a foot or so from the junction, close enough so that its force is not spent before the flume divides.—*A. S. Pearson, John H. Dulany & Sons, Inc., Exmore, Va.*

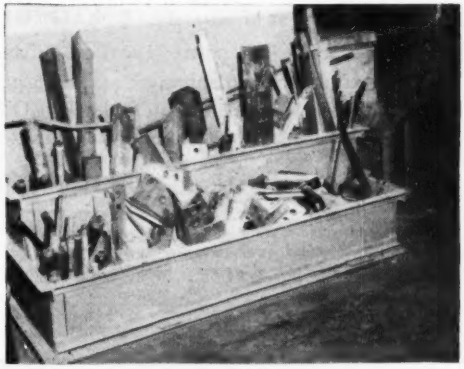


Box Chute Made of Bent Pipe

At our plant, the chute down which empty wood cases slide to supply dressed poultry packing stations is fabricated from a few lengths of pipe,—(1) in photos—curved at the discharge end to direct cases onto the overhead roller-conveyor (2).

Case guides (3), also made of pipe, are welded to uprights from the outside pipes. They continue the length of the roller conveyor to serve as guides there, also. At each end of the chute, pipes are anchored by welding to angle-iron cross-members (4) which serve as chute supports, as well as spacers.

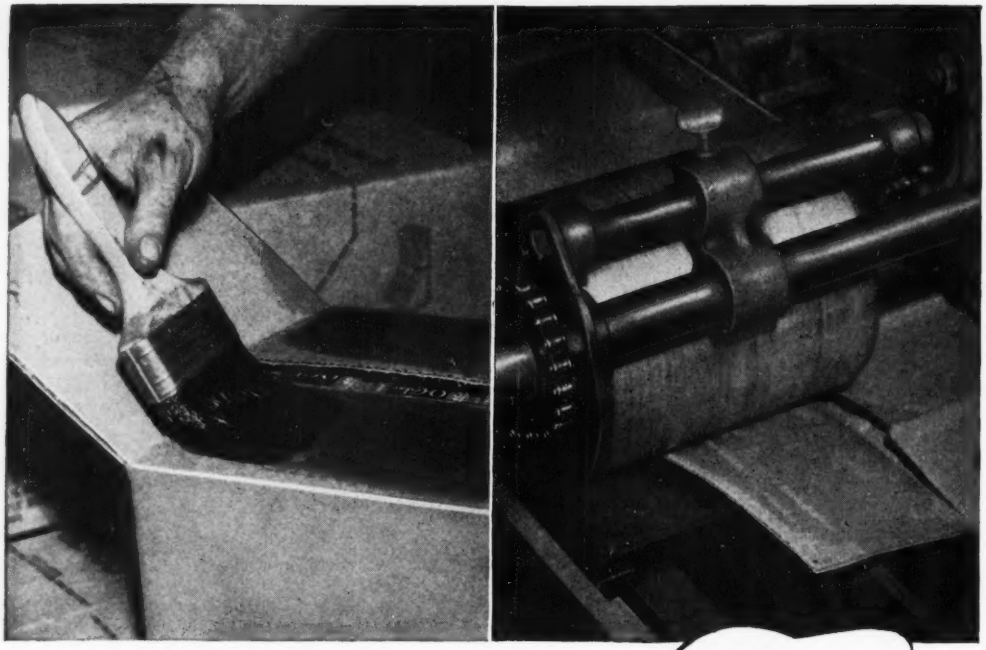
Fabrication of the chute from pipe has the advantages of long life and low-cost construction. Weight of chute places little strain on the rods which suspend the assembly from the ceiling.—*Stokes Homan, Poultry Technologist, Armour and Company, Salisbury, Md.*



Scrap Bin Removes Injury Hazard

Merely by providing handy bins in which to chuck odds and ends of pipe and scrap, we have greatly improved our shop operations.

Scrap no longer litters the floor and corners, to cause



Seal CASES IN 20 SECONDS!

Paisley SCIENTIFIC ADHESIVE SERVICE

BOXEAL is the new *fast setting* Shipping Case Glue which tears fibres 15 to 20 seconds after application by brush or machine. Brings new high speed and efficiency to all production lines where short pressure time is essential. BOXEAL permanently seals all types of shipping boxes, corrugated, Fourdrinier kraft, jute, solid fibre. Non-toxic, odorless, stainless, and most of all . . FAST SEALING!

Get our complete laboratory report on Paisley BOXEAL and take advantage of the offer to send a trial 5 gallon shipment at the 55 gal. drum price available to all drum users of shipping case glues. We'll ship ON APPROVAL, F.O.B. our nearest plant, New York or Chicago. Fill in the coupon below, attach it to your letterhead, and mail it to us TODAY.

DON'T WAIT . . FILL IN AND MAIL THIS COUPON FOR GENEROUS TRIAL OFFER

Gentlemen: Please send complete information about Paisley BOXEAL Shipping Case Glue.

☐ You may send, on approval, trial 5 gal. shipment of "BOXEAL" at 55 gal. drum price.

☐ Send me a copy of Laboratory Report on "BOXEAL".

FIRM _____ STREET _____

CITY _____ ZONE _____ STATE _____ BUYER _____

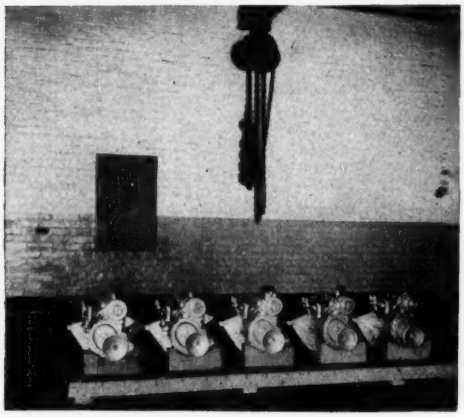
PAISLEY PRODUCTS INCORPORATED

1770 CANALPORT AVENUE, CHICAGO 16, ILL. PHONE CANAL 6-2219

630 WEST 51st STREET, NEW YORK 19, N.Y. PHONE COLUMBUS 5-2860

Manufacturers of Glues · Pastes · Resin Adhesives · Cements and related Chemical Products

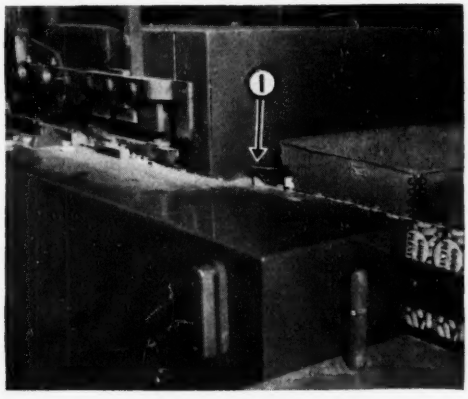
accidents. Nor can it be found under machines. For all such left-overs are now gathered in the bins. Our workers "took to" the bins because they quickly recognized that it is easier to select a needed piece from this store area than to search about the shop.—*F. A. Wenske, Assistant Superintendent, Plant Maintenance, Eastern States Farmers Exchange, Buffalo.*



Time-Saver Mobile Engine Storage

When we cradled our new, reconditioned, and spare truck engines on a long platform mounted on casters, we made engine replacement much easier and also much faster.

Now, when a spare engine is to be taken from its cradle (photo) for installation in a truck, the storage platform is pushed on its casters until the selected engine is under the chain hoist. Then the engine is lifted, transported along the overhead I-beam to the truck, and lowered into place.—*James Owens, Milk Truck Supervisor, Abbotts Dairies, Inc., Philadelphia.*



Device Increases Packaging Output

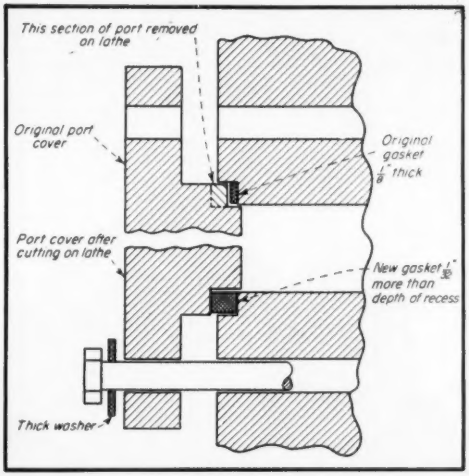
Interruptions in our package over-wrap operations have been reduced and the production rate of three filling, tuck-closing, and over-wrapping lines has been increased —merely by the installation on each of a micro-switch operating an individual-line alarm.

The machines that fold in the two end flaps and tuck the top closure of our pan-coated licorice flavored candy packages are usually efficient. However, occasionally a package passes the tucking station with one or more of the two flaps protruding.

If such an incompletely closed container is not removed, the over-wrap operation will be interrupted, and production time lost. Therefore, vigilance of an operator on each line was formerly necessary to spot and remove such packages.

Now, after a package has left the closing machine, any protruding flap will engage the trigger arm of the micro-switch—(1) in photo—operation of which sounds an alarm.

For each line there is a different sound—a ringing bell on one, horns of different pitch on the other two. Thus, any worker soon learns to spot an incompletely tucked package on the line, and removes it. Since interruption of production is now less frequent, department labor requirements have been eased. — *A. B. Pulzel, Superintendent, Quaker City Chocolate & Confectionery Co., Inc., Philadelphia.*


This section of port removed on lathe
Original port cover
Original gasket 1/8" thick
Port cover after cutting on lathe
New gasket 1/8" more than depth of recess
Thick washer

Ends Leaks on Old Homogenizer

By increasing the depth of recess on the port covers of an old-model homogenizer to accommodate a much thicker gasket, we were able to build up pressures to as much as 4,500 psi. without leaks.

Before the changes were made, ports had leaked excessively at pressures of 2,000 to 3,000 psi.

This is how the changes were made:

Port covers (see sketch) were first placed in a 4-jaw lathe chuck. Then the original gasket seat was deepened so as to provide space for a gasket several times as thick as the one formerly used.

New port cover gasket should extend 3/32 in. beyond the surface of the cylinder block to insure a tight seal, while the new bolt gaskets should be increased in thickness and outside diameter to improve pull-up.

Bakelite gaskets are suitable for holding pressure and are also sanitary.—*Henry Cash, North West Dairigold, Mt. Vernon, Wash.*

POWELL gives you flow control at its best!

Advanced engineering, laboratory control of all materials, expert workmanship and over a century of manufacturing experience make Powell Valves what they are today — flow control equipment at its best.

And because they are made to suit the service, there are more kinds of Powell Valves in use today than of any other individual make.

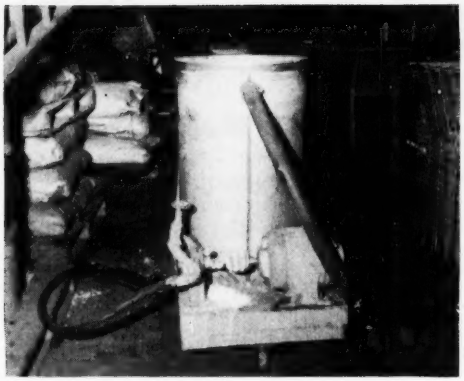
The Wm. Powell Company
Cincinnati 22, Ohio

Fig. 1503
150-pound Cast Steel
S. & Y. Gate Valve
with flanged ends

POWELL

BRONZE, IRON, STEEL AND CORROSION-RESISTING VALVES

DEPENDABLE VALVES SINCE 1846



Brine Mixer Aids Cooler Operation

This portable unit for preparing concentrated brine solutions has greatly improved the efficiency of unit-coolers at our plant.

As brine cascades over the refrigerated cooler coils for removal of any condensed or frozen moisture it becomes diluted. And if the concentration of the brine is not restored, ice forms on the coils and efficiency drops.

In many coolers, provisions are made for adding salt into a small basket or perforated metal compartment submerged in the brine sump so the salt can be dissolved to increase the concentration of the brine.

Our new, more efficient method is to pump dilute brine from the cooler sump to our special portable concentrator (photo) in which the solution is strengthened by percolating through a bed of salt, then is returned to the cooler sump. Brine is quickly brought to full strength and the efficiency of the cooling operation is improved.—*H. F. Davis, Plant Engineer, Danahy-Faxon Stores, Inc., Buffalo.*

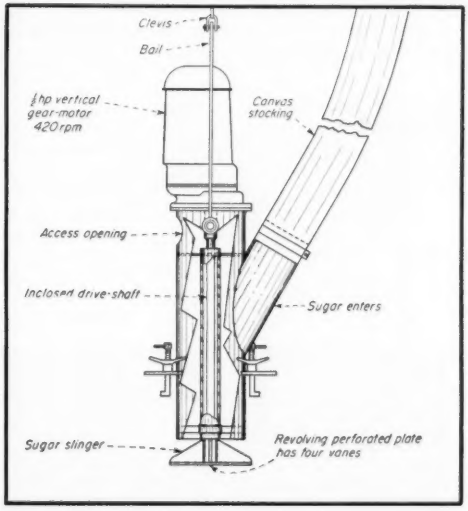
Bulletin Board Helps Production

Letting our employees know the actual dollars and cents cost of careless or faulty workmanship has reduced waste and loss to well below ½ percent in our plant.

We put our points over by posting the weekly cash losses of every department.

Losses due to "cripples" and also waste are recorded on a prominent bulletin board (photo) located above drinking fountains. Here, loss records can be noted regularly. Figures entered reveal to employees the true losses (figures used in the photo are of course, fictitious).

This bulletin-board posting has several advantages: 1. In a limited way, recording actual cost of losses opens company books to employees—a means of showing company confidence and thereby boosting morale. 2. Posting by plants and departments stimulates competition in the effort to reduce losses.—*R. E. Chivers, Asst. General Manager, Fuchs Baking Co., South Miami, Fla.*



Sugar Loader Completely Fills Tanks

By designing a special type sugar-loader, The Amalgamated Sugar Co., Salt Lake City, Utah, is now able to completely fill two 10,000-lb. tanks on its sugar delivery trucks.

Problem posed was that sugar and other finely divided materials normally pile up in cone form, hence a significant void formerly remained around the periphery of the tanks when they were filled to the hatch by gravity flow.

But using the new apparatus, filling is now complete. Here are the details:

Loading device (see sketch) can be lowered through the tank hatches. It is a cylindrical section having on top a ¼-hp., 420-rpm. gear-motor which, by means of an inclosed shaft centered in the cylinder, operates a sugar slinger. Latter is a perforated plate attached to the lower end of the shaft and equipped with four vertical distributing vanes.

Loading assembly, which is raised and lowered into the truck's bin-ports by hand winch, is connected to the former gravity chute by a canvas stocking. Gravity flow is used to fill most of the bin, since sugar flows freely through and around the slinger when not rotating. Only when the top of a bin remains to be filled is the slinger turned on. Then the sugar is sprayed horizontally to fill the periphery to the top.—*F. E. Staff.*

HOW MUCH DO FILTER

Have you ever thoroughly investigated both the direct and indirect cost of filter cloths in your plant? If not, the chances are you will be surprised to find that annual cloth replacement and maintenance cost alone runs from $1.00 to $4.00 per square foot of press area per year, depending on the utilization of your press, the product and the type of fabric you use.

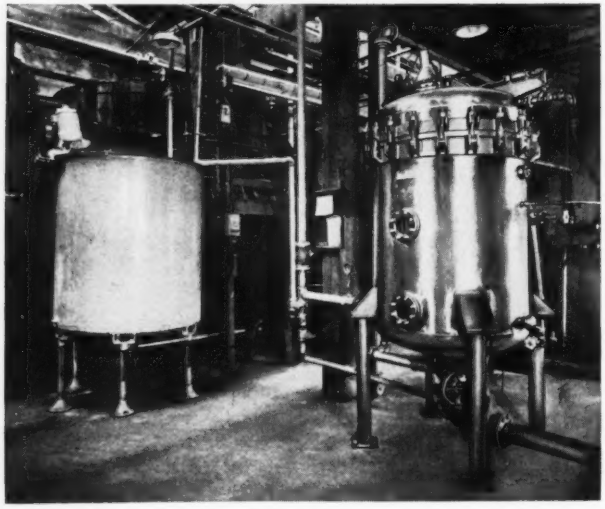
Other costs associated with use of cloths, such as the labor for scraping, handling, washing; breaking and redressing the press; and purchasing time expended in obtaining the cloth you need when you need it will probably be even greater, even if not as easily pinned down.

Here then are three immediate reasons why you should consider switching to modern high-speed Stainless Steel Niagara pressure leaf filters:

1. Niagara filters require no filter cloths. Accurate case histories in our files show that some plants amortize their Niagara filters in a few years on this saving alone.

2. Niagara filters require less labor. When you eliminate filter cloths, you eliminate the back-breaking and costly labor that goes with them. With Niagaras you get a quick, easy, clean operation that takes only a few minutes for one man between cycles.

3. Niagara filters work harder for you. Reduced downtime means more production time and higher production at your filter station. The filter works for you more hours per day—gives you many more gallons throughput with less installed filter area.



COST OF THIS NIAGARA "Auto-Sluice" filter, which removes impurities from weak pectin liquor, was amortized by user in less than one year, out of savings over previous filtration methods.

By switching to Niagaras, many press users have realized over-all savings that amortize the cost of the new filters in months, as well as unsanitary conditions.

Entirely aside from savings, here are eight sound reasons for installing Niagara filters:

1. No cloth pollution. Since there are no cloths to handle, the danger of contamination from handling is completely eliminated.

2. Sparkling filtrate clarity. Positive removal of solids to practically any degree of clarity you desire—one filtration is usually sufficient to obtain 0-0 bacteria count.

3. No leakage. Fully enclosed, pressure-tight construction eliminates drippage and loss of product at the filter station.

4. Stainless steel construction. Stainless steel at all liquid contact points (also available in nickel, monel, or the metal of your choice).

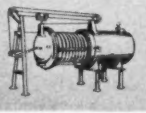
5. One-man operation and cleaning. Single or multiple units can be operated and cleaned easily by one man. The entire leaf battery is accessible for easy cleaning.

6. Higher flow rates on an equal area basis. Niagaras normally give flow rates 2 to 5 times greater than conventional cloth covered Filter Press.

7. Excellent cake-washing characteristics. Nearly true displacement washing is obtainable. This means minimum product loss in the filter cake.

8. Wide capacity range. Sizes range from 20 to 950 square feet of filter area, with average capacity of 10 to 425 GPM in one compact unit. (Even larger areas are available in the new horizontal filter shown at right on the opposite page.)

Niagara Filter CORPORATION

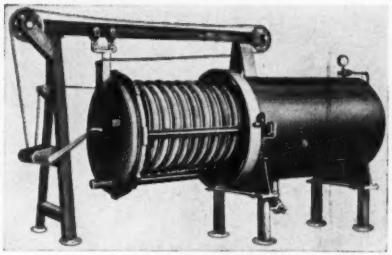


HORIZONTAL for non-aqueous liquids; high solids; cake recovery.

IN EUROPE—NIAGARA FILTERS EUROPE, 36 Leidsegracht, Amsterdam-C, Holland

CLOTHS COST YOU?

NEW NIAGARA STYLE H* FILTER
Low cleaning time . . . no cloth cost



This new Niagara filter answers the need for a filter which can quickly discharge large quantities of semi-dry cakes. A variation of the standard Niagara design, it still retains all the basic advantages of Niagara vertical pressure leaf filters.

A retractable carriage permits all leaves to be withdrawn at once for rapid cleaning. One man can easily discharge as much as 150 cu. ft. of cake in a matter of minutes.

A new closure design, the Q/O* (quick-opening) cover, permits faster, easier opening and closing than ever before in a filter of this size.

The Style H filter, available in sizes up to 1500 sq. ft., is ideal for filtration where high percentages of solids must be removed or where solids must be saved. It is also recommended for all standard liquid clarification where low headroom or other special reasons make its horizontal construction preferable to a vertical filter.

*Trade Mark Patent Applied For.

HOW THE NIAGARA FILTER WORKS

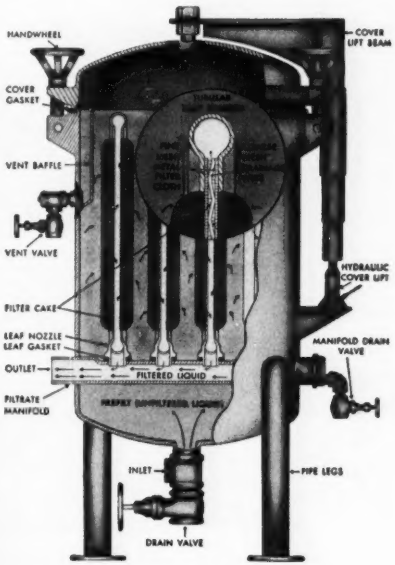
The leaves, which are the heart of the filter, consist of double-faced screen assemblies bounded by a tubular drainage frame leading to an outlet nozzle.

The unfiltered liquid with filteraid in suspension, is pumped into the closed pressure filter tank in which the leaves are placed. Liquid is forced through the fine-mesh screens, on which the filter cake is formed by the solids in the liquid.

Only the clear liquid reaches the inside of the leaves, flowing through the coarse center drainage wire to the tubular frames, and out through the leaf nozzles to the manifold.

When the batch has been completely filtered, or when the cake has nearly filled the space between the leaves, the filter is emptied and the filter cake is sluiced from the leaves with a hose or with automatic high-pressure sprays. Sluicing is done without removing any parts from the filter.

As a rule, the filter is ready to go to work again in 15 minutes to one hour, depending on its size.



Operating figures prove the economic soundness of replacing cloth-covered presses with Niagara filters. For details, write us today. Or mail the coupon for descriptive literature.

THESE 5 SERVICES HELP MAKE HIGH-SPEED, LOW-COST FILTRATION A REALITY IN YOUR PLANT:

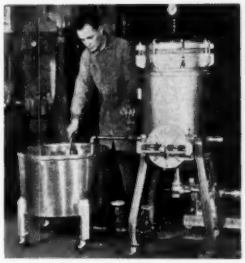
1. Nationwide field service. Niagara representatives in 24 cities know filtration and can give you facts.

2. Modern filtration laboratory determines your requirements accurately by test-filtering samples of your materials.

3. Pilot filter rental plan enables you to "preview" Niagara performance in your plant, at low cost.

4. Custom engineering. A single filter or a complete system, designed for your needs and built in materials of your choice.

5. Installation and start-up are supervised by Niagara factory engineers, always on call.



PILOT FILTER duplicates operation of large production models.

STANDARD VERTICAL — for clarification and "polishing".

"AUTO-SLUICE" for fully automatic cake sluicing.

NIAGARA FILTER CORP., 3085 Main St., Buffalo 14, N. Y.

Please send: ☐ General literature; ☐ Data on horizontal filters; ☐ Data on pilot filter rental

Name_____

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Company_____

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For almost thirty-five years, we have produced ALVA imitation Maple and each year sales progressively increase.

The reason for this solid success is just plain "true-to-the-tree" goodness—for every use by bakers, confectioners, ice-cream makers, extract and syrup manufacturers.

If you don't know ALVA Mapie,
send for your sample now!

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521 WEST 57th STREET, NEW YORK 19, N. Y.

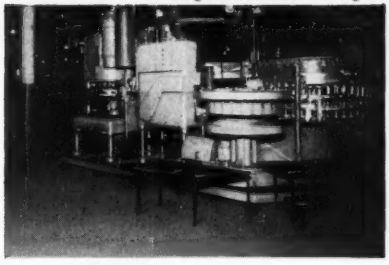
Alva FLAVORS

TOUGH FLOORS FOR TOUGH CONDITIONS

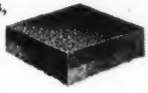
BLUE TEMPER FEREM FLOORS

Smith Dairy Products Co.

Bottling house of Miller Brewing Co.



In your plant you can have dense, ductile heavy duty floors, showing no noticeable wear for long periods and involving practically no upkeep costs, even when subjected to abrasive traffic and shock. Such floors are constructed with Ferem, the "Blue Temper" component in the floor topping, replacing sand, stone and silica. Ferem is used in heavy duty floors, loading platforms, corridors and runways in newly constructed buildings, or when replacing worn or eroded floors. Ferem is resistant to the corrosive action of chemical solutions . . . and has proven satisfactory under the wet floor conditions of many industries.



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Breweries, Beverage Plants	Chemical Plants
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HORN

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Manufacturers of materials for building maintenance and construction

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A. C. HORN COMPANY, INC.,
Long Island City 1, N. Y.

Please send me ☐ complete data on FEREM FLOORS

☐ free copy of your 96-page Construction Data Handbook

NAME_____ TITLE_____

FIRM NAME_____

ADDRESS_____

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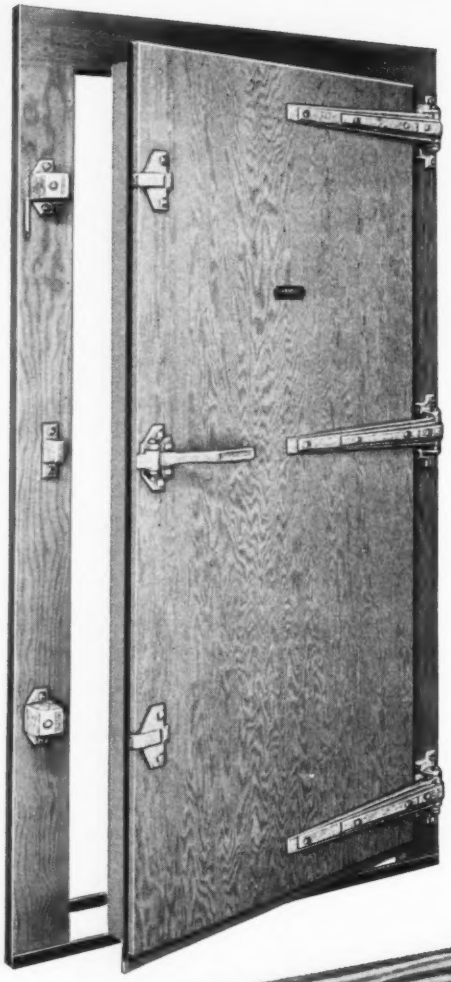
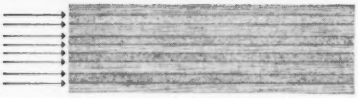
Why "MARINE QUALITY" Plywood

with plastic bonding

makes Series "50" the finest cold storage door ever built



PLASTIC BOND GIVES EXTRA STRENGTH



Synthetic resin bond used between all plies. Uniform strength of bond and stress equalization assured by hot pressing and tempering after setting.

INSOLUBLE PLASTIC MAKES BOND WATERPROOF

SOAK IT

Passes test of alternate soaking 16 hours and drying 8 hours, repeated three times without affecting bond.

BOIL IT

Plastic bond passes four-hour boil test without any separation at plies.

PLASTIC BONDING IMPROVES SANITATION

Inorganic nature of bond will not support bacteria or fungi.

Monopanel Construction of Series "50" Doors Gives You These Other Advantages

- **Smooth One-Piece Panels**—Look better, easier to keep clean.
- **7 Times Stronger**—By test compared with horizontal sheathing. Cross lamination of plies distributes strength equally in both directions.
- **6 Times More Rigid**—By test compared with horizontal sheathing. Large one-piece panels front and back give extra rigidity of box frame construction.
- **Rugged Adjustable Hardware**—E-Z-Open TWO Point Fastener and Adjustoflex hinges specially developed by Jamison to maintain uniform gasket pressure.
- **Dependable Gasketing**—Resilient Lo-Temp gasket for top and sides and tough flexible Sillseal gasket for door sill.

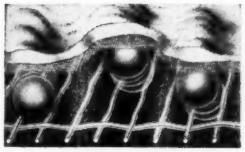
JAMISON

HAGERSTOWN, MARYLAND, U. S. A.

For details and dimensions request Jamison Catalog No. 3. Jamison Cold Storage Door Company, Hagerstown, Md., U.S.A.

SIFT IT— CLEANER, FASTER MORE EFFICIENTLY WITH DAY RO-BALL

A DAY RO-BALL stabilized Gyrating Screen is a "must" for every modern plant. It means cleaner, faster, more efficient screening day-in and day-out. Check these advantages and see for yourself why DAY RO-BALL is first choice on thousands of progressive production lines:



SUPER-ACTIVE BALL CLEANING DEVICE

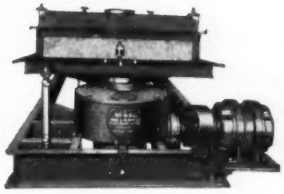
The exclusive design of the Day ball-retainer screen provides scores of rebound points in each compartment. That means evenly distributed vibration over the entire screen . . . permits the use of finer mesh . . . keeps the mesh free and open for more efficient screening.

DUST-PROOF INSPECTION PORTS

Rim and cover are both cast aluminum. Precision-fitted to be positively dust-proof.

SELF-ALIGNING TAIL END BEARINGS, STABILIZING DRAG LINK

Slide-type bearings; base of cast iron and top bearing of graphite-impregnated plastic. Large-size for long life. Drag link with rubber blocks on both ends to maintain alignment, assure smooth operation; never need lubrication.



STABILIZER PREVENTS ROCKING

Larger size RO-BALL Sifters incorporate a stabilizer that maintains the horizontal position of the screen and prevents rocking. Both ends have rubber blocks for smooth operation; no lubrication needed.

See your J. H. Day Sales Engineer or write—

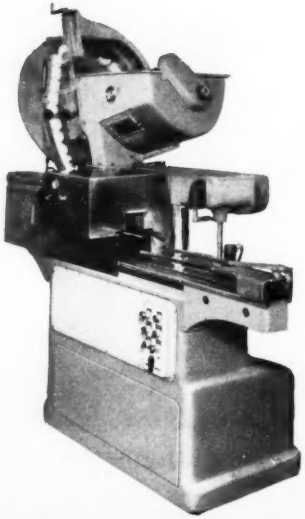
THE J. H. DAY CO., 1146 Harrison Ave., Cincinnati 22, Ohio for detailed literature

THE J. H. DAY COMPANY • CINCINNATI 22, OHIO

INCORPORATED

At last! ...a Vacuum Seal

...and high speed production with the Cem Vacuum Lug Capper!



This machine gives packers something never before offered in any equipment . . . VACUUM SEALING WITH LUG CAPS. Fast and completely automatic in operation, the Cem Vacuum Lug Capper provides important advantages in production. It gives sure, dependable lug capping on a wide range of jar sizes, cap sizes and products. Changing from one size to another is easy . . . can be done in a matter of minutes.

with Sales Appeal...

Now you can vacuum pack at high speeds with a closure that housewives know and like . . . the CROWN Vacuum Lug Cap. This cap is a dependable hermetic seal . . . is easy to remove . . . and makes a perfect re-seal. Its popularity with consumers is a well established fact. And with Crown's new automatic vacuum capper it can be applied at speeds which keep pace with modern production lines.

New possibilities in Vacuum Packing

Fast application of the Crown Vacuum Lug Cap offers new possibilities in the vacuum packing of many kinds of foods . . . possibilities which you cannot afford to overlook. Here is a closure well liked by consumers . . . which gives your product added sales appeal . . . and at the same time provides high speed production in your plant. Of course, you will want more complete facts right away and we are prepared to give them to you. Phone, wire or write us.

The Crown Vacuum Lug Cap

The Crown Lug Cap with its patented Slip Rubber Ring is a superior closure for a wide variety of vacuum packed foods. Here is the closure that gives the kind of vacuum sealing housewives prefer . . . a closure that is known for its easy removal and efficient re-sealing.

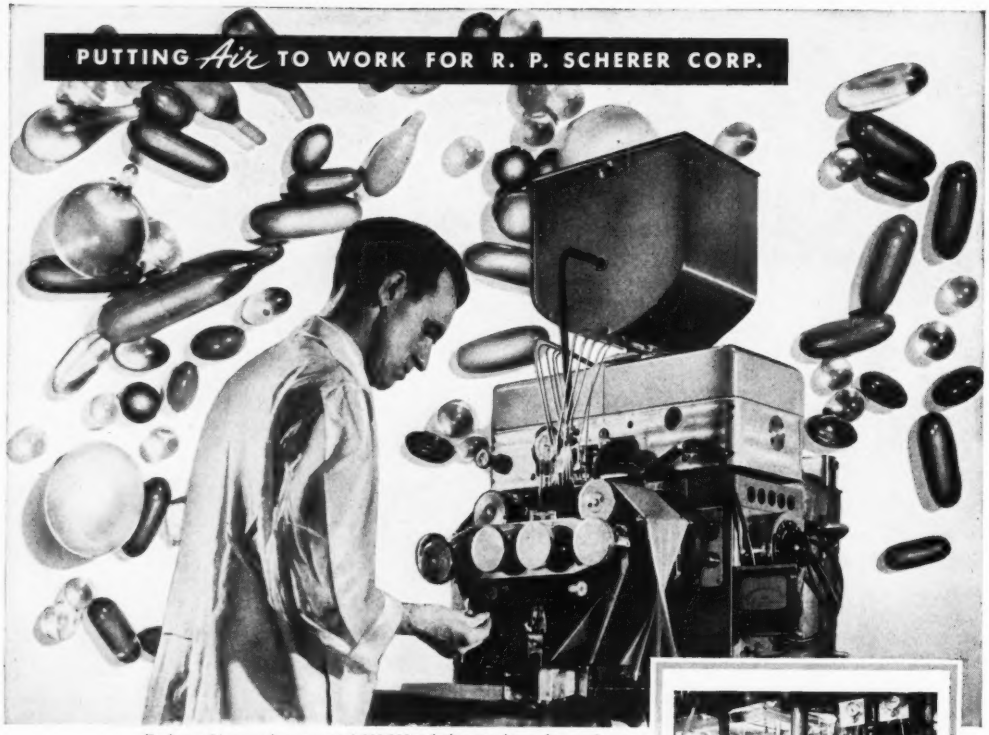
The Slip Rubber Ring used in these caps not only seals dependably but also contributes to easy removal because it contains a special lubricant which prevents it from sticking to the glass.

In addition, Crown Slip Rubber Rings are cut extra thick . . . they seal off any slight irregularities in the surface of the jar . . . they will not cut through . . . they will not fall out in transit, during application or when the cap is removed from the jar.

CROWN CORK & SEAL COMPANY

Machine Sales Division • Baltimore 3, Maryland

PUTTING *Air* TO WORK FOR R. P. SCHERER CORP.



Each machine produces up to 1,000,000 gelatin capsules a day, and controlled atmosphere is a "must" to assure dependable production schedules.

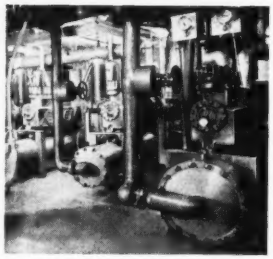
KEEPING CAPSULES IN CADENCE FOR
9 TROUBLE-FREE YEARS

Capsules . . . capsules . . . capsules—name your size, shape and color! They turn out millions a day filled with anything from vitamins and medicine to lighter fluid and insecticide here at R. P. Scherer Corp. in Detroit. But watch out for moisture-laden air. Until they're dried, these soft gelatin containers are regular little water magnets.

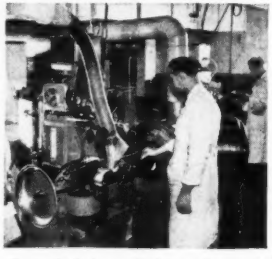
The answer? Rigid, unvarying control of temperature and humidity 24 hours a day, seven days a week! It takes really dependable equipment for these unusual requirements. That's why Westinghouse Air Conditioning was selected.*

The result? For nine years their Westinghouse system has operated continuously without a single shutdown caused by mechanical failure. This full-time service equals *forty years* of normal service on an equivalent comfort air conditioning system.

Whatever your process involves in the way of a controlled climate, we can help you *put air to work* with air conditioning, air cleaning and air handling equipment. Call the Westinghouse Air Conditioning Distributor listed in the Yellow Pages, or write to Westinghouse Electric Corp., Air Conditioning Division, Hyde Park, Boston 36, Mass.



Heads, end bells and side plates have not once been removed since installation in 1942 despite a continuous service record totalling 54,000 hours.



Controlled air supplied to each capsulating machine insures the absolute uniformity of product that is required.

*Installed by Mechanical Heat & Cold, Inc., Detroit, Michigan

YOU CAN BE SURE... IF IT'S
Westinghouse

J-80253

AIR CONDITIONING

TUNE IN ON HISTORY! *Only Westinghouse brings you complete coverage of four-month political campaign over CBS television and radio.*

Presenting....

VANITROPE®

A NEW VANILLA-LIKE *Flavor* MATERIAL

As a vanilla-like flavoring agent of extremely high potency, VANITROPE has demonstrated an unusual adaptability in all branches of the food, confectionery, baking and ice-cream fields.

It's advantages are these....

FLAVOR

Used in substantial proportion with other synthetics, VANITROPE brings flavor closer to the true natural vanilla.

STRENGTH

The flavor strength of VANITROPE is sixteen times that of vanillin. In the presence of sugar, this ratio is considerably higher.

CHARACTER

Pure white crystalline synthetic, non-discoloring and non-hygroscopic, with a remarkable stability at high processing temperatures.

COST

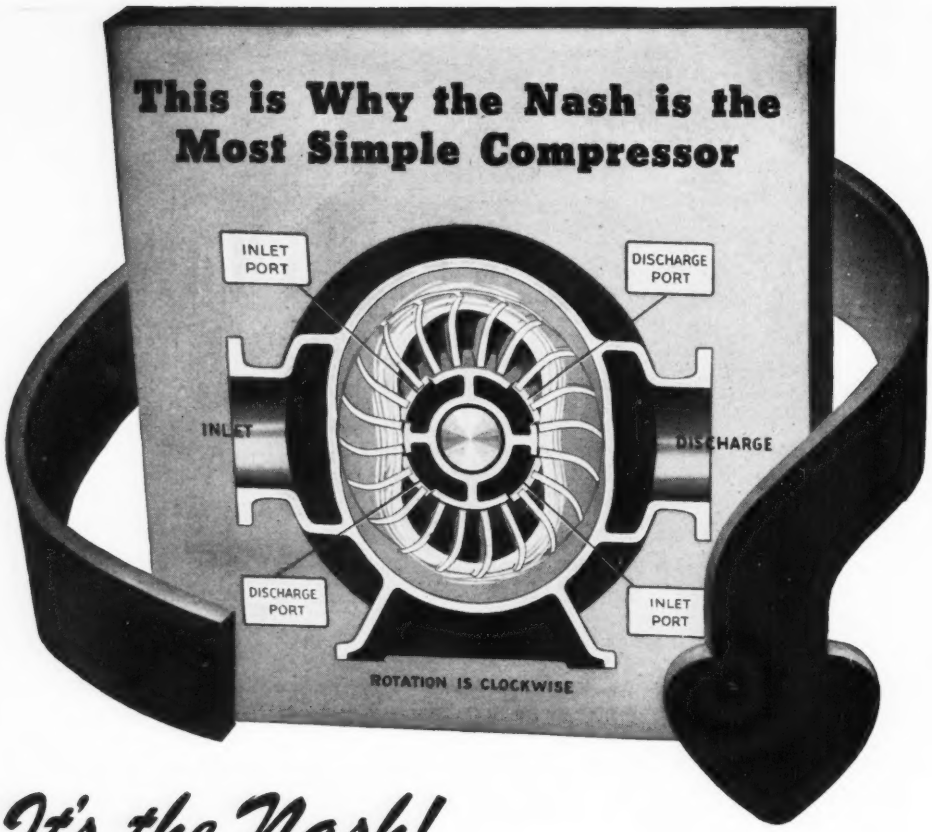
The use of VANITROPE permits savings of up to 50% over standard vanilla-like synthetics at equivalent flavor strength.

VANITROPE has proven its value in nationally distributed foods as well as in exhaustive laboratory investigations. VANITROPE, a registered trade name for propenyl guaethol, is of interest to all flavor users. . . . . Inquiries are solicited. Samples and technical bulletins are available for study.

VANITROPE IS A CONTRIBUTION OF

Shulton Inc.
FINE CHEMICALS DIVISION
630 FIFTH AVENUE, NEW YORK 20, NEW YORK

This is Why the Nash is the Most Simple Compressor



It's the Nash!

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods. Data on these pumps sent immediately on request.

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

NASH ENGINEERING COMPANY

324 WILSON, SO. NORWALK, CONN.

Aluminum drums that beat any Container you've ever used

Outstanding for these 8 reasons . . .

1. **EASY TO HANDLE**—Aluminum drums are light in spite of the thick metal and hard alloy used.
2. **SANITARY**—The smooth, seamless inner surfaces and rounded corners make these containers highly sanitary and easy to clean.
3. **ABLE TO TAKE ABUSE**—These drums are made of thick, extra-hard aluminum alloy. They resist denting, even under rough handling.
4. **NON-RUSTING**—Aluminum drums are unaffected by moisture, therefore never require the use of an inhibitor oil.
5. **ODORLESS**—Aluminum will not absorb and pass along odors, nor can it impart any odor of its own. Aluminum safeguards purity and flavor.
6. **APPROVED**—Wear-Ever Aluminum drums are approved by Government Inspectors, as well as by local sanitary codes.
7. **CUT REPLACEMENT COSTS**—Because of the hard, thick alloy from which these drums are made, they last a long time—cut replacement costs.
8. **COOL PRODUCTS QUICKLY**—Since aluminum is a good conductor of heat, these drums work perfectly where products are to be chilled, by carrying off heat rapidly and reducing the temperature of their contents.

Now in use in meat packing, canning, baking, candy, and pharmaceutical plants.

50 gallon drum with hinged cover and dolly. Also comes in 30 gallon size. All drums available with or without dolly and with choice of covers, as pictured below.

Slip-over cover. Has handy hook so it can be hung on edge of drum.

Hinged cover. Has lock-on bolt and cover rest.

SEND COUPON TODAY

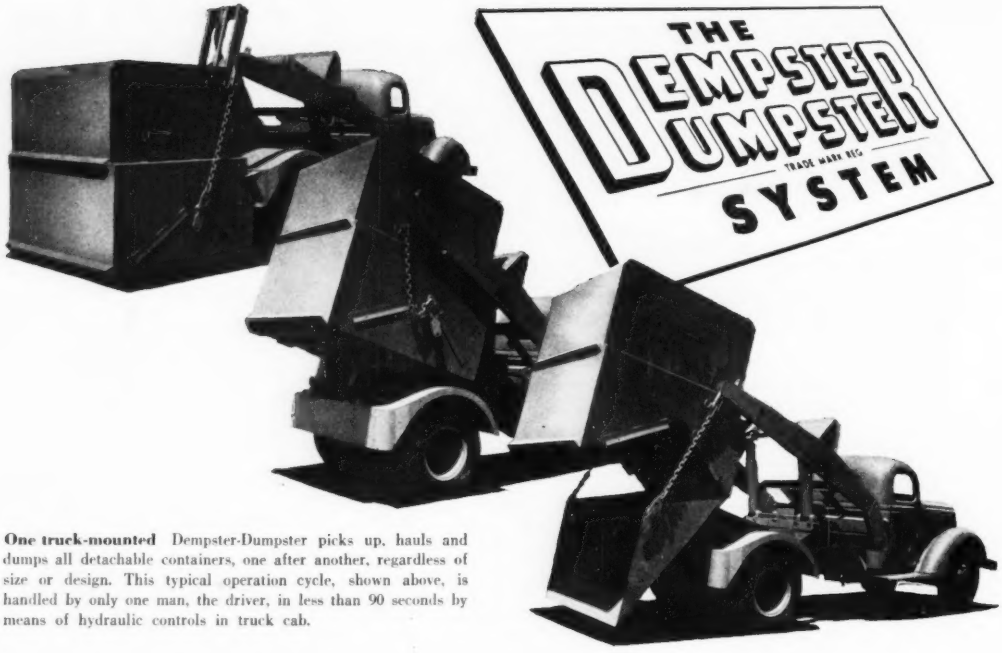
The Aluminum Cooking Utensil Co.,
307 Wear-Ever Bldg., New Kensington, Pa.

Please provide me with further details regarding your aluminum drums. I am particularly interested in the ☐ 30 gal. size—☐ 50 gal. size.

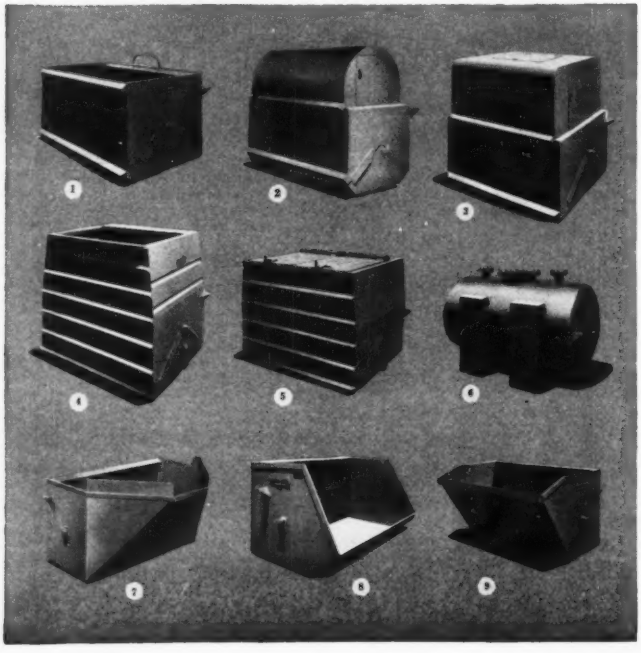
NAME. . . . . .

TITLE. . . . . .

Tear out, clip to your company letterhead and mail today.



One truck-mounted Dempster-Dumpster picks up, hauls and dumps all detachable containers, one after another, regardless of size or design. This typical operation cycle, shown above, is handled by only one man, the driver, in less than 90 seconds by means of hydraulic controls in truck cab.



1—Cuts Cost of Equipment and Operation— It is not unusual for one Dempster-Dumpster to perform the work of from 3 to 5 conventional trucks . . . reducing investment accordingly. Eliminating trucks also means eliminating tires, gas, oil, maintenance and man hours.

3—Eliminates Re-Handling of Materials – Re-handling of materials, which by conventional methods are hand loaded by loading crews into dump trucks, is eliminated. Each detachable container remains at its convenient location until loaded. Then, in less than a minute, it is picked up by Dempster-Dumpster and taken to destination. There it is dumped or set down intact . . . saving hundreds of man hours annually.

• • •

At left are a few standard containers for general requirements— 1—Drop Bottom Container built up to 10 cu. yd. capacity to handle heavy materials. 2—Apartment Type for bulk trash and rubbish with sump bottom for handling moist materials. 3—Universal Type available with top and end doors. 4—Drop Bottom Pressed Steel Type for lighter service. 5—Drop Bottom Pressed Steel Type with counterbalanced spring lids. 6—Tank Type Container meeting A.S.M.E. specifications. Capacities up to 1,200 gallons. 7—Tilt Type with Converged Lip for handling fine aggregate, wet or fluid materials. 8—Skip Type with Lip to assist in holding certain types of loaded materials in place. 9—Tilt Type for handling heavy materials. Built water-tight.

DEMPSTER BROTHERS,

MOST EFFICIENT METHOD OF MATERIALS HANDLING BY TRUCK EVER DEVISED

If you collect and move bulky, light or heavy materials in your plant operation . . . be they solid, liquid, dust, rubbish or waste, the Dempster-Dumpster System merits your careful consideration and investigation. This revolutionary method of bulk materials handling by truck can save you thousands of dollars annually!

The fundamental reason why the Dempster-Dumpster System is the most efficient method of materials handling by truck is because, in this system, one truck serves scores of detachable containers. In other words, a truck-mounted Dempster-Dumpster . . . with only one man, the driver . . . picks up, hauls, dumps or sets down intact . . . one after another . . . any required number of big Dempster-Dumpster Containers.

The hydraulically operated Dempster-Dumpster is mounted on any make truck chassis of suitable size.

The steel containers are available in a wide variety of designs best suited to the type of materials handled—be they bulky, light or heavy . . . solids, liquids or dust . . . trash or rubbish. They range in size up to more than three times the capacity of the average dump truck body. The containers are spotted inside and outside your plant at convenient materials accumulation points. A few of the dozens of detachable containers are shown here so that you may see the flexibility of this system in handling all types of materials in your plant with one truck. It may be that none of these containers will fit your own particular need. But remember there are Dempster-Dumpster Containers that will, either standard or special design.

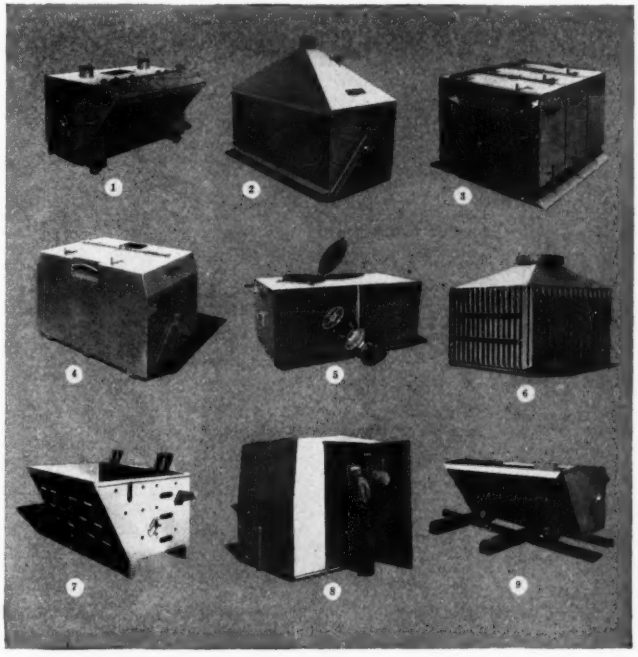
More efficient and lower cost materials handling in your plant may be simply a matter of getting the probing minds of your engineers and ours together. Our files contain hundreds of inquiring letters that ultimately resulted in savings of thousands of dollars annually in every conceivable type of manufacturing plant. A discussion with our engineers might develop the same results for you. If advisable, they will be glad to make, without obligation on your part, a proper survey to determine just what equipment you may need. The Dempster-Dumpster System is manufactured exclusively by Dempster Brothers, Inc.

2—Eliminates Standing Idle Time— One man, the truck driver, replaces truck loading crew. Detachable containers are pre-loaded through normal accumulation. Truck-mounted Dempster-Dumpster and driver never stand idle because there is always a pre-loaded detachable container to be serviced.

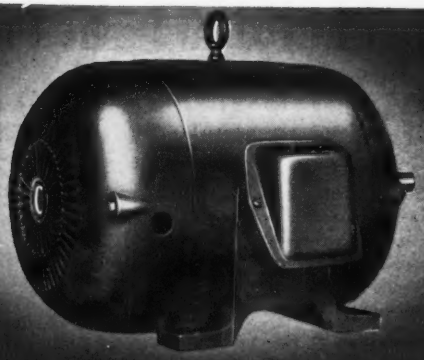
4—Increases Efficiency, Sanitation and Good "Housekeeping"— The Demp-Dumpster System is a complete, unified plan for area-wide materials handling. Materials to be disposed of or transferred are placed in a nearby container as they accumulate. Containers used for trash and rubbish are fire-proof, rat-proof and fly-proof. No other method of materials handling by truck can match the Dempster-Dumpster System in efficiency and low operating cost!

• • •

At right are a few containers built for special requirements— 1—Five cu. yd. container with swivel casters for handling waste blast sand. 2—Three cu. yd. Dust Collector Type equipped with gaskets. 3—Multi-Karry Container equipped with three 2 cu. yd. steel boxes with casters and lids. 4—Six cu. yd. drop bottom container with two spring-hinged lids and special loading opening in top. 5—Rectangular Tank Type Container with gate valve and gasketed Lid. 6—Chlorinator Ash Container designed for handling hot residue approximately 1500° F. 7—Tilt Type Container built for cast linings for handling hot materials. 8—One of several special "Tool and Equipment" Type Containers. 9—One of several types of special built containers equipped with ball bearing trucks.



772 Shea Bldg., Knoxville 17, Tennessee



The Protection of Century Type TEFC* Motors Keeps Production Rolling

T E F C

- Smooth exterior surface — easy to clean
- Cast iron frame resists rust and corrosion
- Rugged construction — sturdy lugs for rough handling
- Integral cast feet resist corrosion when mounted in places where processed material may contact the feet

Your Maintenance Man..

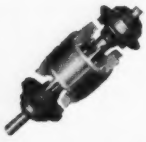
who must keep your Production Turning, knows how to evaluate the inside of the Motor. Ask him about these Century Construction features.

Century type TEFC protected type motors are very popular in the chemical and food processing industries for resisting rust and corrosive fumes. They are widely used in the metal working industries to protect the vital parts against abrasive dust or gritty oil fog.

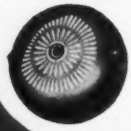
Specify Century motors on the motorized equipment you purchase, or call a Century branch office or a Century distributor when you purchase motors. Century manufactures a complete line from ½ to 400 H. P.

- Vital parts of motor protected — sealed-in inner frame.
- Reverse direction of motor without changing fan — Fan runs in either direction.

- Uniform ventilation — surrounding outside of inner frame.
- Smooth straight-through ventilating passages.
- Winding electrically insulated 6 different ways.



- Uniform rotor winding — high pressure cast aluminum.
- Ball bearing housing keeps grease "in"—dirt "out"—lubricated for several years' normal service, with grease plugs when you want to lubricate bearings.



- Easy to remove fan guard for inspection — 2 screws hold steel fan guard in place.

Century C MOTORS

CENTURY ELECTRIC COMPANY

1806 Pine Street • St. Louis 3, Missouri

Offices and Stock Points in Principal Cities

You are always close to CONTINENTAL

CONTINENTAL PLANTS ARE LOCATED AT:

Auburndale, Fla.
Baltimore, Md. (3)
Birmingham, Ala.
Chicago, Ill. (5)
Cincinnati, Ohio
Denver, Colo.
E. St. Louis, Ill.
Elwood, Ind.
Gary, Ind.
Harvey, La.
Hayward, Calif.
Houston, Texas
Hurlock, Md.
Los Angeles, Calif.
Malden, Mass.
Mankato, Minn.
Milwaukee, Wisc.
Oakland, Calif.
Oil City, Pa.
Passaic, N. J.
Paterson, N. J.
Pittsburgh, Pa.
Portland, Oregon
Sacramento, Calif.
San Jose, Calif.
Seattle, Wash.
St. Louis, Mo.
Stockton, Calif.
Syracuse, N. Y.
Tampa, Fla.
Terminal Island, Calif.
Walla Walla, Wash.

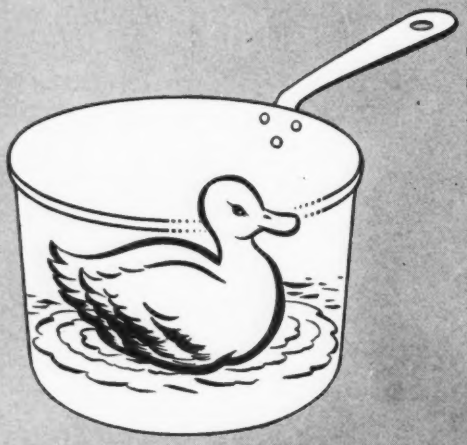
Wherever you operate throughout the length and breadth of the U. S. A., you are never far from Continental. Being close to you geographically, we understand your local conditions and problems. We're better able to deliver the containers you want at the time you want them. And should you need any of our competent advisory or equipment repair services, you get them on the double. The whole Continental story is too long to tell here. Why not give us a call?

CONTINENTAL CAN COMPANY

CONTINENTAL CAN BUILDING
100 East 42nd Street New York 17, N. Y.

Eastern Division	Central Division	Pacific Division
100 E. 42nd St., New York 17	135 So. La Salle St., Chicago 3	Russ Building, San Francisco 4

duck soup!



DUO-TITE . . . . . ▶

the perfect "No-Sift" bag. Ideal for insecticides, fertilizers, chemicals, any products which must be packaged in siftproof containers. Its sturdy construction combines special liners with folding, gluing and heat-sealing.

THERMOSEAL . . . . ▶

the bag with 20% more protection. It's a fact. There is 20% more protection in Betner's THERMOSEAL than in other closures. Eliminates staples. Insures water-vapor protection, siftproofness, and retention of flavor.

LAMOFILM . . . . . ▶

the bag with extreme moisture-impregnability. Locks moisture out. Protects freshness, flavor, goodness of food by a patented film of rubberized compound held firmly in suspension between two layers of glassine.

FLAV-O-TAINER . . . ▶

the bag with vacuum-packed freshness. Pliofilm* lined, all inner seams are hermetically sealed. Replacing air with inert gas, and sealing top, FLAV-O-TAINER becomes an airtight unit. Used whenever freshness is a must.

*Mfd. by Goodyear T. & R. Co.

Betner's service is complete. Betner has the facilities, the packaging know-how and cost-conscious experience to recommend ideas . . . produce finished bags . . . advise you of the proper machinery to insert liner bags in cartons.

YES, SIREE! The most difficult packaging problems are "duck soup" to Betner experts, who delight in mastering complicated challenges. Betner engineers have designed bags with outstanding features . . . special folding, gluing and heat-sealing . . . bags constructed for specific, demanding purposes. The availability of multi-color preprinting and finish on Betner bags makes them valuable, sales-stimulating aids. Write today for full particulars.

Whatever the packaging need, there's a Betner bag...FILL IT!

BENJ C BETNER CO *Devon, Pa.*

PLANTS ALSO LOCATED IN:
- *RICHMOND, VIRGINIA*
- *PARIS, TEXAS*
- *APPLETON, WISCONSIN*
- *LOS ANGELES, CALIFORNIA*

Cut the costly excess . . . with Pure Oil Industrial Lubricants

In the complete line of high-quality industrial lubricants Pure Oil makes, you will find many oils and greases designed to do several *different* jobs, instead of one specific job.

And to do each job *equally well.*

This makes it possible for you to do *all* your lubricating with *fewer* lubricants. In other words you can

simplify and save...with Pure Oil Industrial Lubricants

If reducing your lubricants inventory would help reduce your costs (and don't you think it should?), write for full details to: The Pure Oil Company, Industrial Sales, 35 East Wacker Drive, Chicago 1, Illinois.

THE PURE OIL PURE COMPANY, U.S.A.

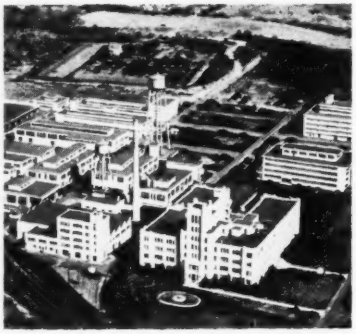
Be sure with Pure

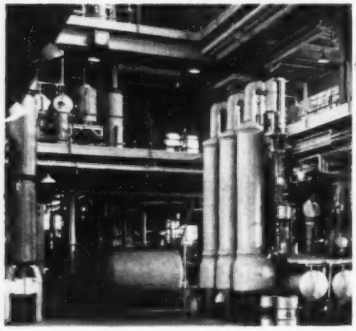
TO MARGARINE

An introduction . . .

OF SPECIFIC VALUE TO YOU is the famous synthesis of vitamin A by the Roche research team of Dr. Otto Isler in 1947. Dr. Isler announced this synthesis at the International Congress for Pure and Applied Chemistry in London on July 22, 1947. The following month crystalline vitamin A was exhibited.

This synthesis starts with Citral, obtained from lemon grass and, through twelve operations in a multi-million dollar plant requiring over 500 pieces of large scale chemical engineering equipment, ends up with active vitamin A, identical with Nature's own. Commercial production for the entire needs of the United States and Canada is a reality.





THE NAME ROCHE has been famous for years in the pharmaceutical, medical, milling and baking fields and other branches of the food industry. Roche is a great manufacturing center where vitamin A and other pure vitamins are produced by the tons for leading manufacturers all over the world. Roche Park totals about 100 acres and contains over 40 modern buildings to house manufacturing, research and administration facilities. Here science is made to work for man. From original Roche research came Reichstein's synthesis of ascorbic acid in 1934, Karrer's synthesis of riboflavin in 1935, a new synthesis for thiamine in 1937 and of vitamin E in 1938 to mention only a few.

- **For Margarine fortification**
- **Packed for your convenience**
- **Accurately weighed**
- **Exact amount for single batch**
- **Strict laboratory control**
- **Highest quality**

MANUFACTURERS
An invitation . . .

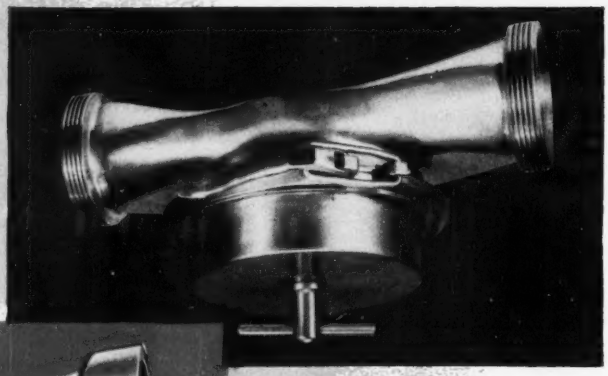
You are cordially invited
by the
Vitamin Division of Hoffmann-La Roche Inc.,
to use our organization
as your source of supply for vitamin A.
Your satisfaction is assured.
R.S.V.P.

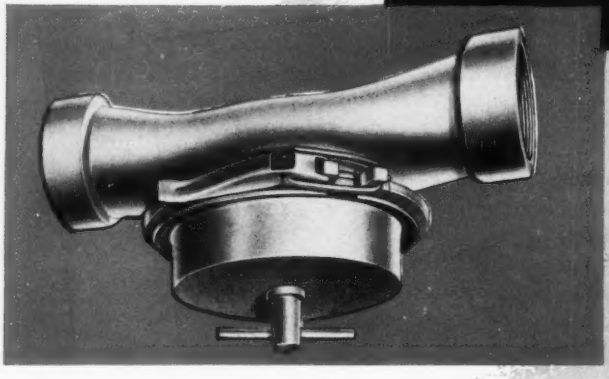
. . . . **ROCHE** VITAMIN **A** ACETATE AND PALMITATE . . . .

VITAMIN DIVISION • HOFFMANN-LA ROCHE INC., NUTLEY 10, N. J.
In Canada: HOFFMANN-LA ROCHE, LTD., Montreal, Que.

STOP PRODUCT CONTAMINATION

with
TRI-CLOVER
MAGNETIC
FULL-FLOW
TRAPS





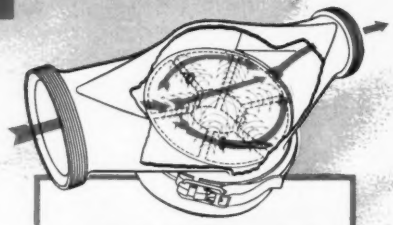
● **Above: Tri-Clover *ALL-SANITARY* Full-Flow Magnetic Trap, with highly polished finish inside and out, and Acme sanitary threaded ends. Available in 2", 3" and 4" O.D. sizes.**

● ***Left:* Tri-Clover *INDUSTRIAL* Type Magnetic Full-Flow Trap, with pickled finish. Available with I.P.S. screwed ends, or with Van Stone ends for every application, in 2", 3" and 4" sizes.**

TRI-CLOVER Magnetic Full-Flow Traps are now available in both Sanitary (polished finish, with Acme Threads) and Industrial (pickled finish, I.P.S. threaded or flanged) construction in 2", 3" and 4" sizes. Both types are fabricated from type 304 Austenitic stainless steel, and offer maximum corrosion-resistance, streamlined flow, with minimum product agitation and friction.

With an extremely wide magnetic contact area, plus the use of the strongest magnet known, you can now eliminate the hazard of tramp iron in your liquid conveying lines, which can contaminate your product and damage your machinery.

Over 30 years of specialized experience in supplying the food, dairy and chemical industries with corrosion-resistant fittings, valves, pumps and tubing has been utilized in this newest development of Tri-Clover. For further details, write for your copy of CATALOG SHEET 1151.



Designed for POSITIVE ACTION

The arrows above illustrate how fluid, upon reaching the Tri-Clover Magnetic Trap, flows in a widening stream over the magnetic field. Tramp iron is trapped in a recessed area over the extra-wide magnet area, and is easily removed by simply releasing ring clamp. No need to remove entire magnetic trap from the line.

READY FOR CLEANING IN JUST 2 SECONDS

. . . It's just this simple. Unsnap ring clamp. Clamp, magnet and gasket are freed and ready to clean. That's all there is to it!

Tri-Clover
MACHINE CO.
Kenosha, Wisconsin

TRIALLOY AND STAINLESS STEEL SANITARY FITTINGS, VALVES, PUMPS, TUBING, SPECIALTIES

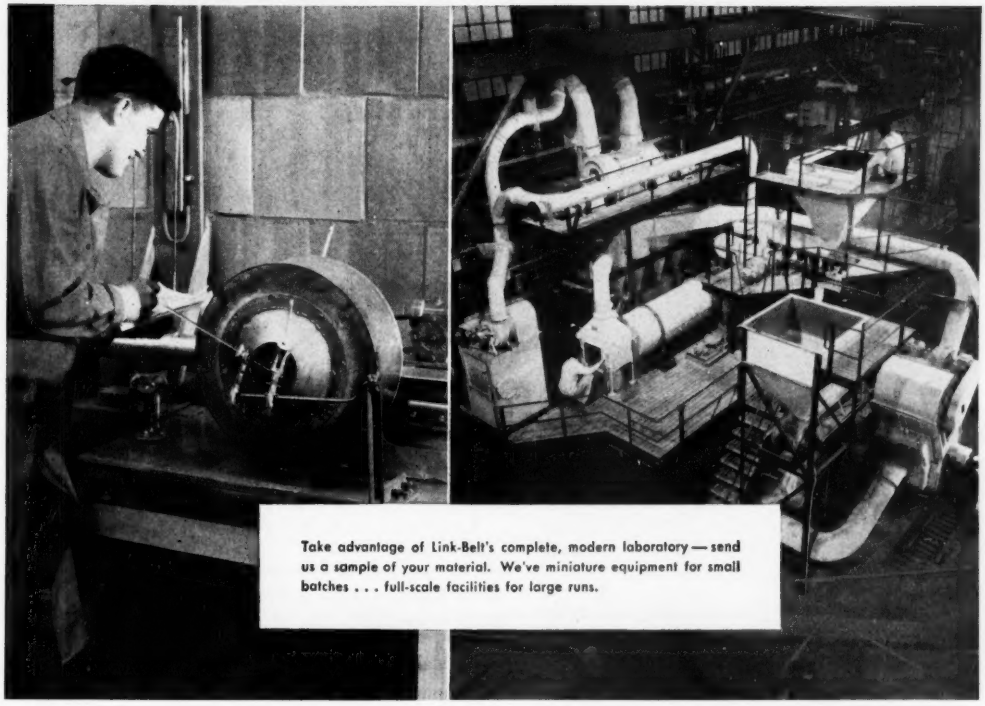
FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS

THE Complete LINE

T252

AN INVITATION
to manufacturers with drying, cooling or roasting problems...

LINK-BELT will test a pound or a ton of your material



Take advantage of Link-Belt's complete, modern laboratory — send us a sample of your material. We've miniature equipment for small batches . . . full-scale facilities for large runs.

Whatever size the sample, we will test-run your material, work out procedures in this laboratory that can be duplicated in your plant

If your production has been delayed or handicapped by drying, cooling, or roasting obstacles, there's an easy, no-obligation way you can get an immediate answer . . .

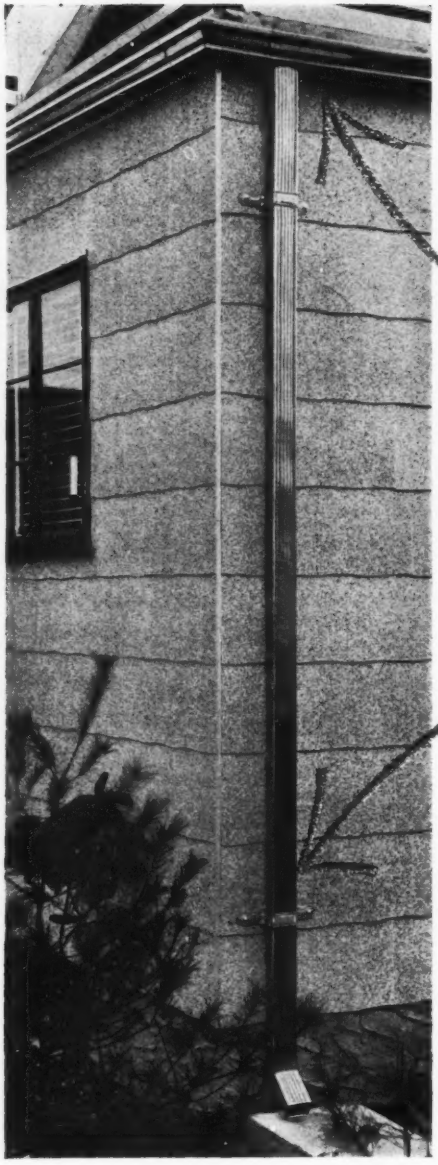
Follow the lead of hundreds of others who have utilized Link-Belt's scientific laboratory to test-run their materials. As a result of this testing and research, scores of different materials are now being processed by Link-Belt Dryers installed all over the world.

And here's an added Link-Belt service — if you can't ship samples, we'll put a unit on loan right in your own plant. Find out how you can put these Link-Belt services, plus Link-Belt experience, to work for you. Call the Link-Belt plant or office nearest you.

LINK-BELT

DRYERS
COOLERS
ROASTERS

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities. 12,424



an answer to the shortage of 18-8

REZISTAL 430

strong · corrosion-resistant · readily available

Gutters and downspouts are only one of many applications where Crucible Rezistal 430 Stainless Steel offers an adequate substitute for the 18-8 types of Stainless.

Rezistal 430's chromium content assures its resistance to an impressive list of industrial and natural corrosive media. In many of these, its performance approaches that of 18-8. Rezistal 430 also does well under many conditions involving high temperature oxidation and scaling. And what is most important, you can fabricate it by all the standard methods.

We will be glad to send you more information on the corrosion-resisting and mechanical properties of Rezistal 430, or to advise you on its suitability for your particular application. Write us today.

CRUCIBLE first name in special purpose steels

52 years of Fine steelmaking

REZISTAL 430 STAINLESS STEEL

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

STAINLESS • REX HIGH SPEED • TOOL • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

A BETTER SOLVENT

for finer food flavors

propylene glycol, U.S.P.

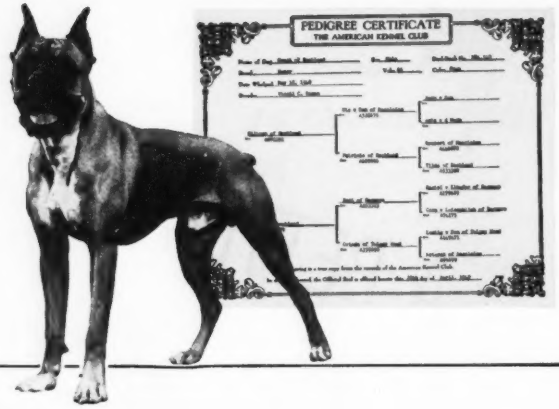
Dow Propylene Glycol, U.S.P. is widely used as a safe, effective solvent in the preparation of flavor solutions from essential oils and resins, and in the extraction of many other natural flavoring materials.

Stable emulsions are more easily formed with Propylene Glycol as a gum wetting agent.

Because of its performance, economy and high purity, Propylene Glycol, U.S.P. has found wide acceptance in the food field. Get the facts on how it can help you by writing to Dow, Dept. OC 15.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

DOW
CHEMICALS
INDISPENSABLE TO INDUSTRY AND AGRICULTURE



THE BOXER, America's No. 1 favorite for 1949, gets his name from the fact he uses his front paws in much the same way as a human boxer when fighting. Coloring of coat ranges from fawn to brindle, but his muzzle is always black.

Buyers Who Know

Look at the Pedigree

TRADE MARK UNION

Dependable Packaging Since 1872

THE UNION SHIELD is the pedigree mark of a box with 75 years of packaging leadership behind it.

That's why Standard Brands uses Union boxes to carry Royal Puddings —choice of millions—to dealers all over the country.

The Union shield means every step in the making, from tree to finished box, is tested and controlled by one management in America's largest integrated pulp-to-container plant.

Three modern box plants, five of the world's largest paper machines, and vast timber tracts are your guarantee of consistent quality, consistent service and fair price, today and in the future.

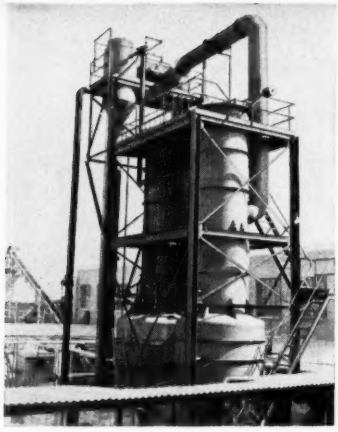
That's why every month more makers of famous brand products are shipping in Union boxes.

UNION Corrugated Containers

UNION BAG & Paper Corporation

Principal Offices: WOOLWORTH BLDG., NEW YORK 7, N. Y.

***Corrugated Container Plants:* SAVANNAH, GEORGIA • CHICAGO, ILLINOIS • TRENTON, NEW JERSEY**



Know how we helped put the squeeze on a giant?

They bring in a giant citrus crop each year down in Central Florida. And a big part of it goes to Fosgate Citrus Cooperative's new plant to be converted into frozen concentrate.

Last year we installed a Carrier Concentrator at Fosgate. They chose a Carrier two-effect Concentrator, designed for low-temperature, high-vacuum evaporation. It took 1604 gallons of fresh juice an hour, turned out 404 gallons per hour of concentrate.

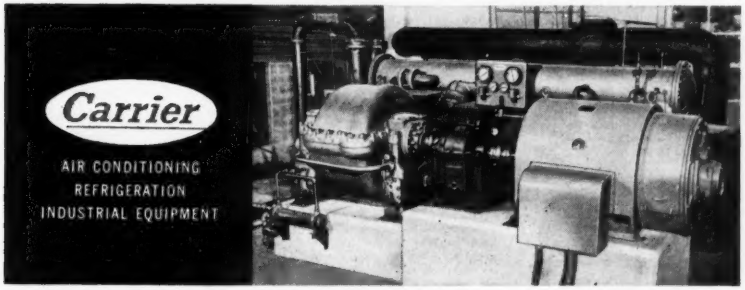
Was Fosgate satisfied?

Well, the installation was so successful that Fosgate *immediately ordered another Carrier Concentrator of the same capacity.*

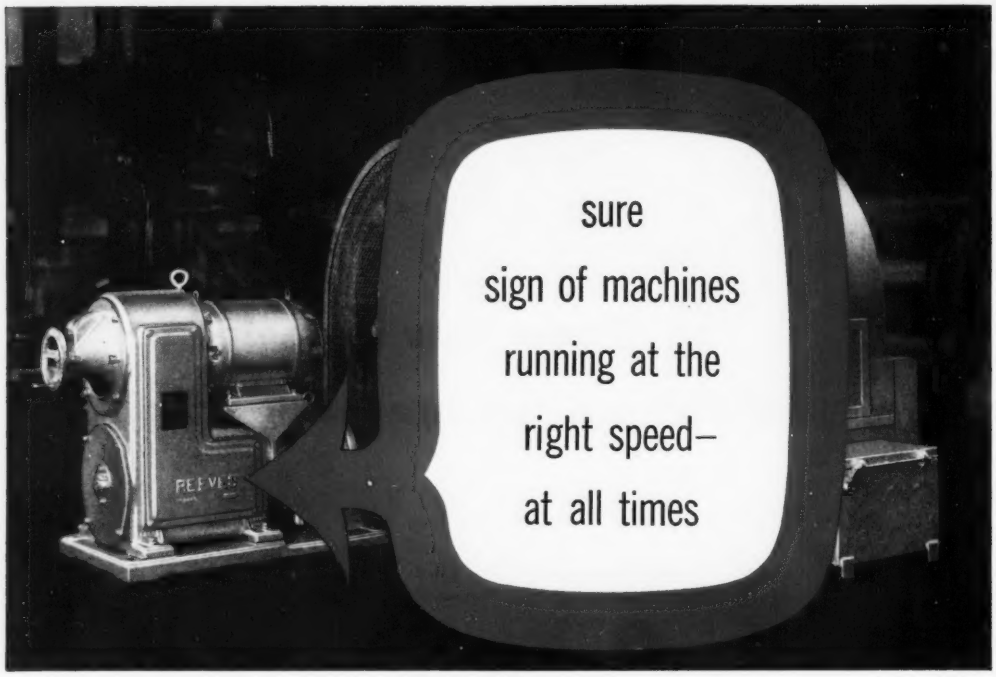
Their installation now covers almost an acre and a half of ground near Orlando. It's got to be big, for into it are coming two million boxes of fruit a year, and from it will roll some 50 million cans of finished product each season. That's almost 300 six-ounce cans a minute . . . *five every second.*

And the whole operation has been built around their two Carrier Concentrators. Working with a Carrier auto blender, these Carrier Concentrators are now turning out 808 gallons per hour of blended concentrate, ready for canning and freezing.

Maybe you're planning to put the squeeze on a giant crop yourself. Or perhaps your concentrate plans are more modest. Maybe they involve citrus juice. Maybe they involve some other product. Whatever you have in mind, we'd like to work with you. Just write a letter to Carrier Corporation, Syracuse, New York.



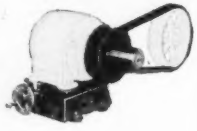
This Carrier Centrifugal Refrigerating Machine furnishes refrigeration for Fosgate Citrus Co-op's entire plant: the two Carrier Concentrators, three Carrier Cold Diffusers, and air conditioning for the processing room and laboratory. In addition, it supplies brine at minus 30 degrees for an immersion type can freezer.



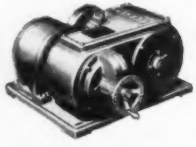
Reeves Variable Speed Drives

Reeves makes America's only complete line of variable speed drives —not 1, but 3 types to choose from

VARIABLE SPEED TRANSMISSION: Provides stepless speed adjustability over a wide range—as high as 16 to 1; sizes to 87 hp. Vertical or horizontal designs—open or enclosed.



VARI-SPEED MOTOR PULLEY: Converts any standard, constant-speed motor to a variable speed drive. Speed variations up to 4 to 1. Sizes to 10 hp.



VARI-SPEED MOTODRIVE®: A complete variable speed power plant. Combines any standard, constant-speed motor, REEVES speed-changing mechanism and gear reducer in one, compact unit. Sizes to 25 hp; speed ratios as great as 10 to 1.

Machines equipped with REEVES Variable Speed Drives . . . have a wider work range, handle more different shapes, sizes, and materials . . . because REEVES *always* provides the accurate, infinitely variable speed adjustability that is the key to efficient production.

With the turn of a handwheel, touch of a button, or automatically—*without stopping the machine*—you can change the speed to meet the need of every operation, every operator, and every operating condition. The result is higher rate of production and improved, uniform quality—at lower cost.

For machines now in service and the new ones you plan to buy, standardize on REEVES. Proved in 300,000 successful installations . . . available to you in a wider range of designs, sizes, speed ratios, and controls than any other make of variable speed drives. Send for free catalog No. FE81-G.

REEVES PULLEY COMPANY • COLUMBUS, INDIANA

Recognized leader in the specialized field of variable speed control

accurate • variable
REEVES *Speed Control*

There's No Catch in It!

No, not a catch anywhere in this Fairbanks-Morse *bladeless* impeller. That's how food damage losses are eliminated and handling costs *cut way down!*

The chain in the picture follows the water path through the single channel impeller . . . you can see there are no blades or projections to catch and damage food products.

Even the most delicate fruits and vegetables . . . *even* hard-boiled eggs . . . can be handled without damage with this Fairbanks-Morse Bladeless Impeller Pump.

For complete information, call your Fairbanks-Morse Branch Pump Engineer or write to Fairbanks, Morse & Co., Chicago 5, Ill.

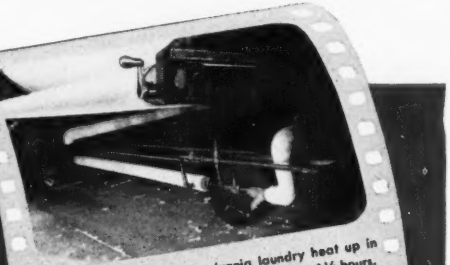
FAIRBANKS-MORSE,

a name worth remembering when you want the best

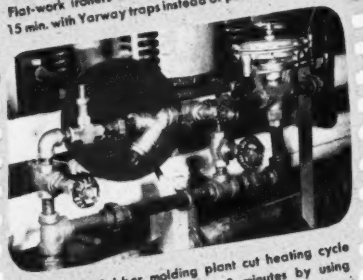
PUMPS • DIESEL LOCOMOTIVES • ELECTRICAL MACHINERY • SCALES • HOME WATER SERVICE EQUIPMENT • RAIL CARS • FARM MACHINERY • MAGNETOS

steam trap trial shows how to increase production

FREE 60-DAY TRIAL

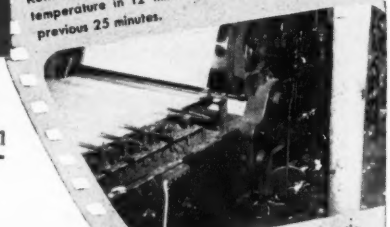


Flat-work ironers in Pennsylvania laundry heat up in 15 min. with Yarway traps instead of previous 1½ hours.



West Coast Rubber molding plant cut heating cycle on presses from 15 minutes to 8 minutes by using Yarway traps.

Kettles in New England hospital kitchen reach cooking temperature in 12 minutes with Yarways instead of previous 25 minutes.



Southern textile mill gets satisfactory slasher production for first time due to faster heating-up with Yarway traps.

These 4 plants—each in a different industry—have something in common. Each installed a Yarway Impulse Steam Trap on a trial basis—and after witnessing the production-boosting results, they standardized on Yarway traps.

Experiences like these are found in hundreds of plants because Yarways are *designed* to get equipment *hot in a hurry,* and therefore into production fast.

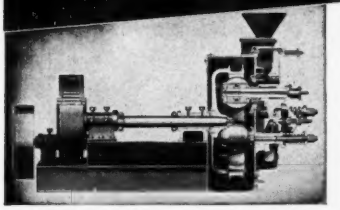
Coupled with other Yarway Impulse Steam Trap advantages like small size, easy installation, stainless steel construction, easy maintenance and low cost—it explains why more than 800,000 Yarways have already been installed.

YARWAY

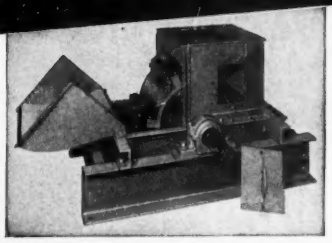
the steam trap designed with more production in mind

YARNALL-WARING COMPANY • 127 MERMAID AVENUE, PHILADELPHIA 18, PA.

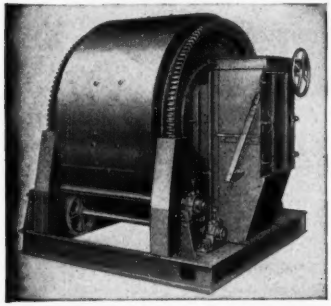
Step-up Production Lower Preparation Costs with STURTEVANT EQUIPMENT



RING ROLL MILL — for medium and fine reduction of hard or soft materials (10 to 200 mesh). Open-door accessibility for easy cleaning. Available in many sizes and capacities.

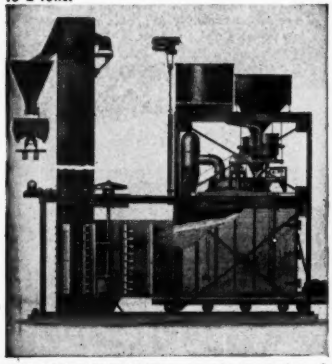


TAILINGS ROTARY PULVERIZER — increases output of fertilizer tailings . . . will not clog . . . leaves no daily accumulation of unground pellets. Capacities up to 25 tons per hour.

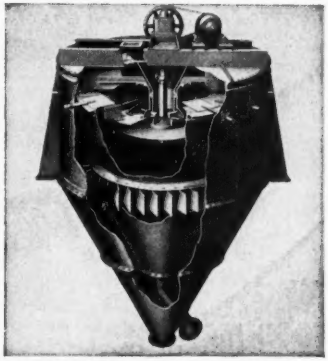


DRY BATCH MIXERS — 4-way mixing action mixes two or more ingredients into an inseparable, homogeneous mass. Open door accessibility makes cleaning easy. Capacities ¼ ton to 2 tons.

MOTO-VIBRO SCREENS — screen everything screenable. Open and closed models with or without feeders. Many types and sizes . . . screens from ½" to 60 mesh.



DEN AND EXCAVATOR — speeds processing of superphosphates. Easily operated by two men . . . produces 16 to 40 tons per batch and up to 480 tons per day of superior fertilizer free from lumps.



AIR SEPARATOR — for finest separation of materials. Capacities from ¼ ton to 50 tons per hour in fineness of 40 to 325 mesh and finer. Increases production of fines, cuts power consumption costs.

Sturtevant Processing Equipment . . . Grinders, mixers, separators, screens, etc. . . . can help you *reduce* today's high manufacturing costs by increasing both machine and operator output, lowering production costs, assuring high quality products.

Records in all types of industries — chemical, plastics, ceramics, cement, food, construction — prove that this equipment works dependably day in, day out with little, if any, maintenance.

Used individually or linked together in proper sequence, they do the job faster and easier than other types . . . handle a larger variety of work.

It will pay you to investigate Sturtevant Processing Equipment for your plant. There is a size and type of machine that will meet your requirements. Write for information.

STURTEVANT MILL COMPANY

106 CLAYTON STREET
BOSTON 22, MASSACHUSETTS

Designers and Manufacturers of:

CRUSHERS • GRINDERS • SEPARATORS
CONVEYORS • MECHANICAL DENS
and EXCAVATORS • ELEVATORS
MIXERS

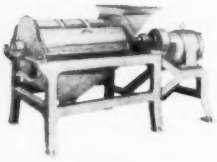
For more information, use post card on last page.

Keep Product Quality Up—Production Costs Down

—with fmc TOMATO PREPARATION AND PROCESSING EQUIPMENT

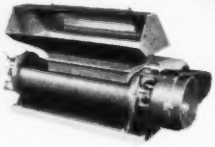
FMC specialized tomato equipment helps build profits for processors three important ways: (1) it *cuts costs* of operation and maintenance throughout the line by using continuous automatic methods; (2) it's *flexible*—types and sizes available to meet varying plant and operational requirements; and (3) it assures a consistently *high-quality* pack of tomatoes, tomato juice and other tomato products.

Write for full information, or call your nearest FMC representative.



FMC PULPERS and FINISHERS

Heavy duty stainless steel paddles and screens. Capacities: Pulpers, 5 to 20 tons per hr. Finishers 20 to 100 GPM.



FMC TOMATO CHOPPER

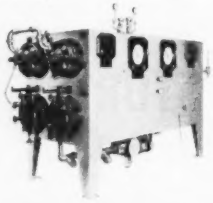
Delivers small uniformly chopped product at 25 tons per hr. Table-level height eliminates feed elevators.

FMC HAND PACK FILLER

Sturdy, stainless top. Gear head motor or packaged variable speed drive for economical, timed operation.

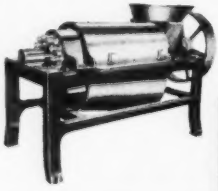
FMC JUICE PROCESSOR

Continuous preheating, pasteurizing, holding and cooling on one base. Capacities: 20–70 GPM. Other units for single heating and cooling.



FMC JUICE EXTRACTORS

Large screen, extra long screw and extraction area for capacities up to 75 GPM. Lower capacity models available.



FMC TOMATO LINES

Thorough washing, sorting and scalding on a continuous conveyor. Available in high or low pressure water systems.

OTHER fmc TOMATO EQUIPMENT

- Washers (Flood-type and rotary)
- Peeling and Inspection Tables
- Scalders
- Fillers (Juices, paster, solids)
- Heating coils

First in Diversified Food Equipment

fmc

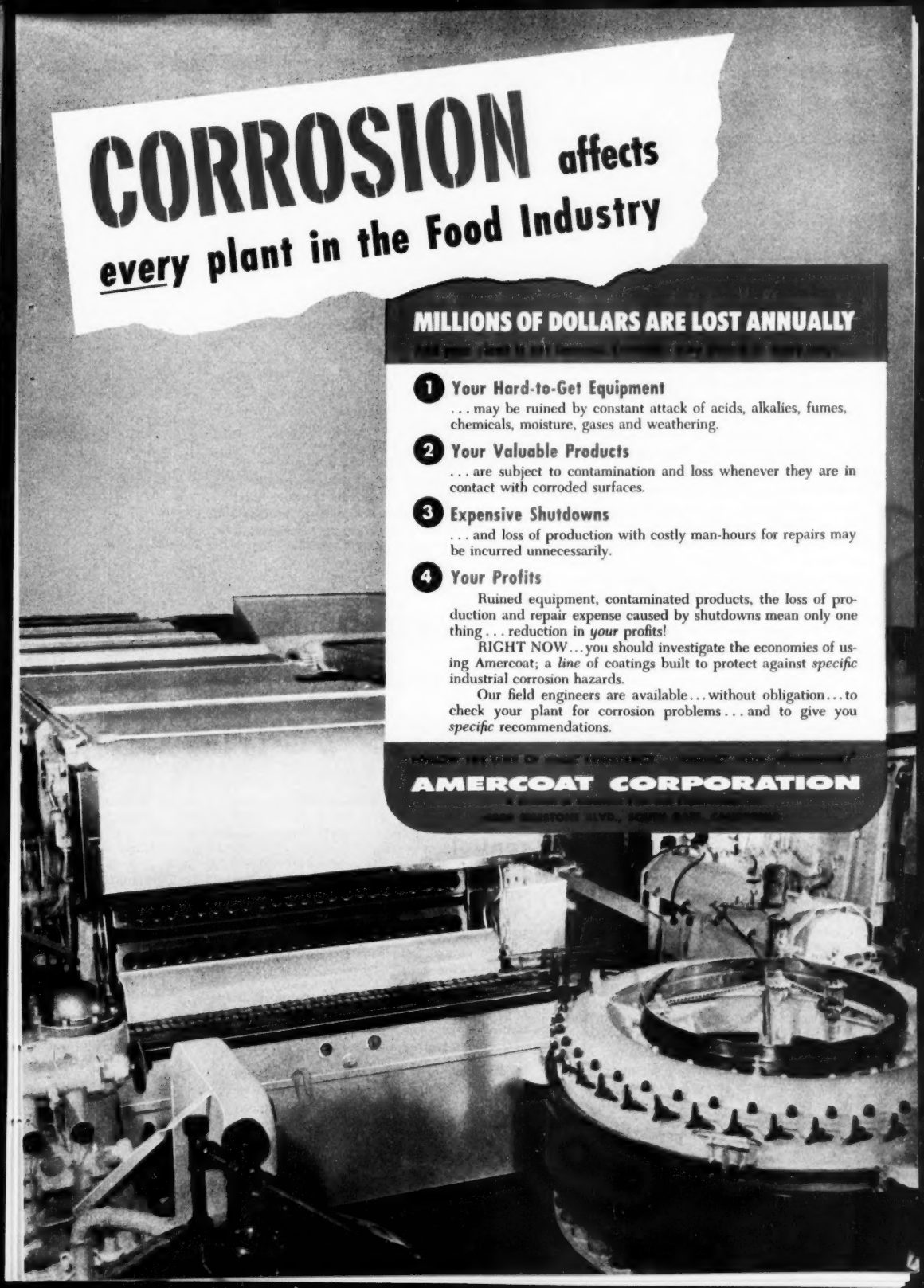
Trade Mark

FOOD MACHINERY AND CHEMICAL CORPORATION

Canning Machinery Division

General Sales Offices:

WESTERN: SAN JOSE 6, CALIFORNIA **EASTERN:** HOOPESTON, ILLINOIS


CORROSION affects
every plant in the Food Industry
MILLIONS OF DOLLARS ARE LOST ANNUALLY
1 Your Hard-to-Get Equipment
. . . may be ruined by constant attack of acids, alkalies, fumes, chemicals, moisture, gases and weathering.
2 Your Valuable Products
. . . are subject to contamination and loss whenever they are in contact with corroded surfaces.
3 Expensive Shutdowns
. . . and loss of production with costly man-hours for repairs may be incurred unnecessarily.
4 Your Profits
Ruined equipment, contaminated products, the loss of production and repair expense caused by shutdowns mean only one thing . . . reduction in *your* profits!
RIGHT NOW . . . you should investigate the economies of using Amercoat; a *line* of coatings built to protect against *specific* industrial corrosion hazards.
Our field engineers are available . . . without obligation . . . to check your plant for corrosion problems . . . and to give you *specific* recommendations.
AMERCOAT CORPORATION

HARNESSING HEAT FOR ALL INDUSTRY

Heat is one of man's most useful servants. It enables him to separate gasoline from crude oil . . . to cook food . . . to refine steel from raw ore and roll it into mile-long sheets . . . to mold plastics into complex shapes. But to do these and countless other jobs, heat must be applied in the correct amounts . . . to obtain critical temperature values.

Forward-looking research and production men realized some years ago that "rule of thumb" operation was entirely inadequate for complex processes. They needed facts obtainable only from automatic measurement . . . performance possible only through automatic control.

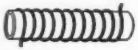
Honeywell has consistently led the way toward meeting the ever-increasing demands for sensitive, precise temperature instrumentation. Continuing research and field experience have developed sensing elements which cover the full range of industrial temperatures . . . instruments which provide any desired degree of flexibility and accuracy . . . and automatic controls which can regulate any measurable production process.

sensing elements

thermocouples

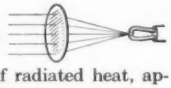
The most versatile of temperature elements, supplied for temperatures from minus 300° to plus 2800°F.

resistance thermometers



a highly accurate means of detecting temperatures from sub-zero to 300°F. . . . especially useful for narrow temperature spans.

RADIAMATIC elements



measure by means of radiated heat, applicable to moving objects . . . to direct measurement of work temperature . . . to extremely high ranges and for many jobs impossible with any other element.

thermometer bulbs

rugged, sensitive elements for moderate temperatures in conjunction with economical instrument types.

instruments

Working with these sensing elements is a complete family of instruments, which afford a broad choice of characteristics to suit the needs of individual temperature measuring assignments. *ElectroniK* indicators, circular chart and strip chart recorders afford the peak in performance . . . featuring continuous-balance, high-speed electronic measurement. *Pyr-O-Vane* millivoltmeter instruments fit many applications where simple, accurate indication and control are essential, but where a continuous temperature record is not required. Brown Thermometers are ideal for recording and controlling temperatures within the range of pressure-filled elements . . . are often supplied as multiple-pen instruments which combine temperature and pressure on one chart.

Modern processes *precise*

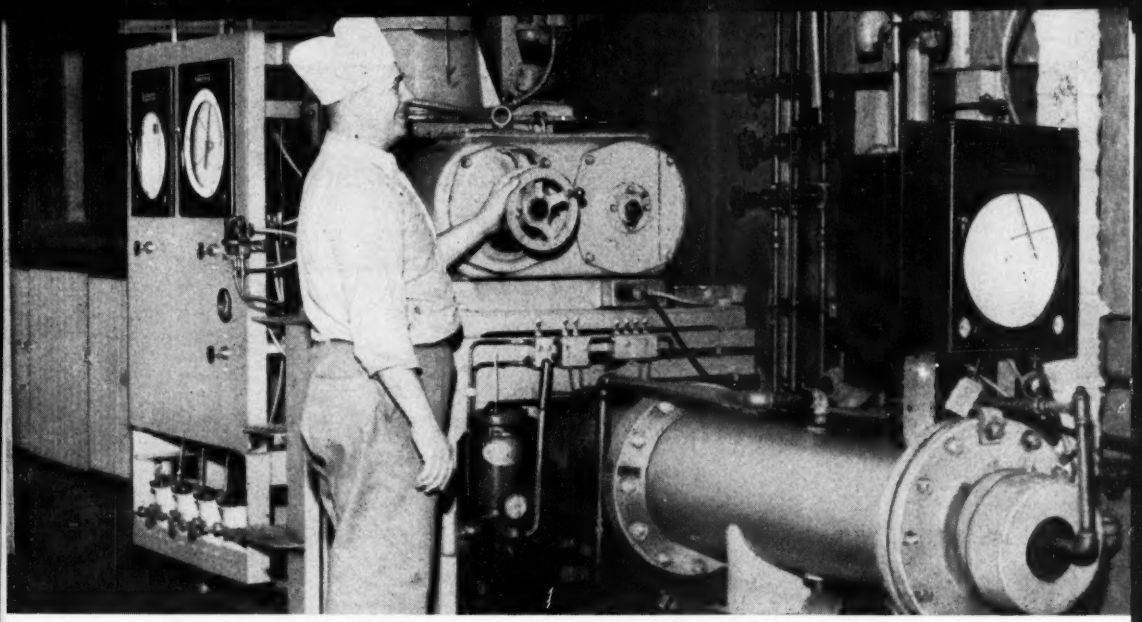
controls

Electric and pneumatic controls, from the simplest to the most complex, have been developed to handle any controllable process.

With *Pyr-O-Vane* instruments you can have electric control of either the two-position, three-position or time-proportioning types.

With Thermometers, electric two-position or pneumatic control of the on-off or proportioning types, and integrally built time-pattern control of the cam-operated type.

With *ElectroniK* instruments, the choice covers practically any kind of pneumatic or electric control, including the most advanced designs that can "think ahead" even better than a human operator . . . plus two-position, three-position and proportional controls (either electric or pneumatic) and the most flexible program controls.



QUALITY OF CHOCOLATE *bars produced by this continuous molding and tempering machine is maintained by an accurate temperature control system, which combines an* **ElectroniK** *controller with controlling thermometers to hold critical temperatures within split-degree limits.*

in the food industry demand

Temperature control

TEMPERATURE is the common denominator of efficient operation throughout the food industry. More than any other variable, it determines product quality in pasteurization, sterilization, batch or continuous cooking, baking, cold storage, and practically every other major food processing or handling operation. And, equally important, accurate automatic control of temperature invariably proves a potent means of cutting labor costs, reducing steam or fuel consumption, and minimizing spoilage.

Working in close cooperation with food technologists, Honeywell has engineered custom-built temperature control systems for the most important food processing operations . . . and has developed specialized temperature-detecting elements for food plant use. Instruments, sensing elements, types of control—all are carefully selected and combined into packaged systems, readily applied to specific processes. These systems embody the most modern techniques, even including controls which automatically conduct the process through preset temperature-time programs.

Wherever temperature enters your processing picture, it will pay you to look to Honeywell—for dependable, accurate control and the engineering know-how essential to successful application. Our local engineering representative is well qualified to make specific recommendations for your plant. Call him today . . . he is as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4512 Wayne Ave., Philadelphia 44, Pa. Service facilities available in more than 55 offices in the United States.

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS

First in Controls

● *Important Reference Data*

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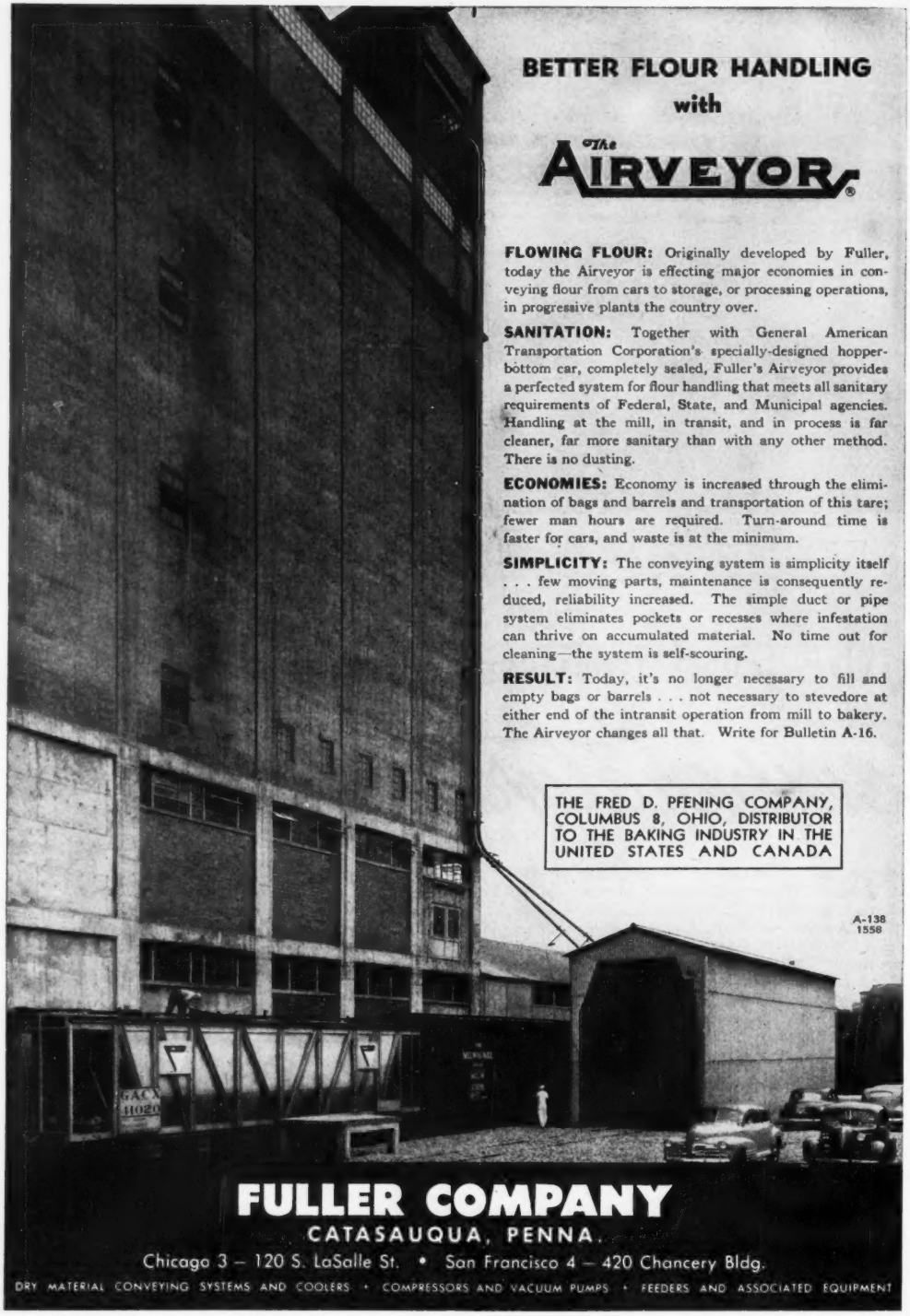

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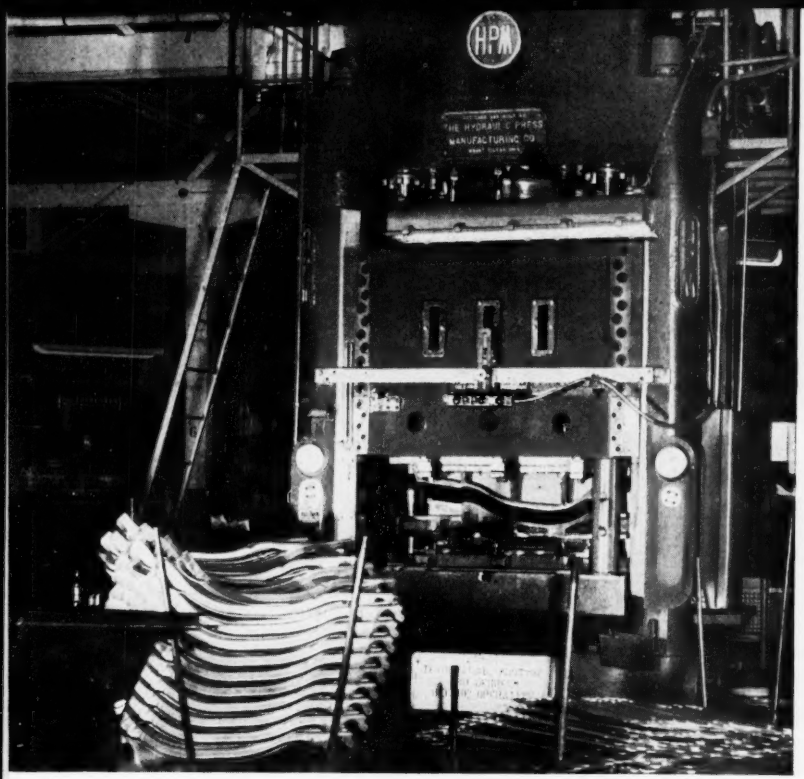

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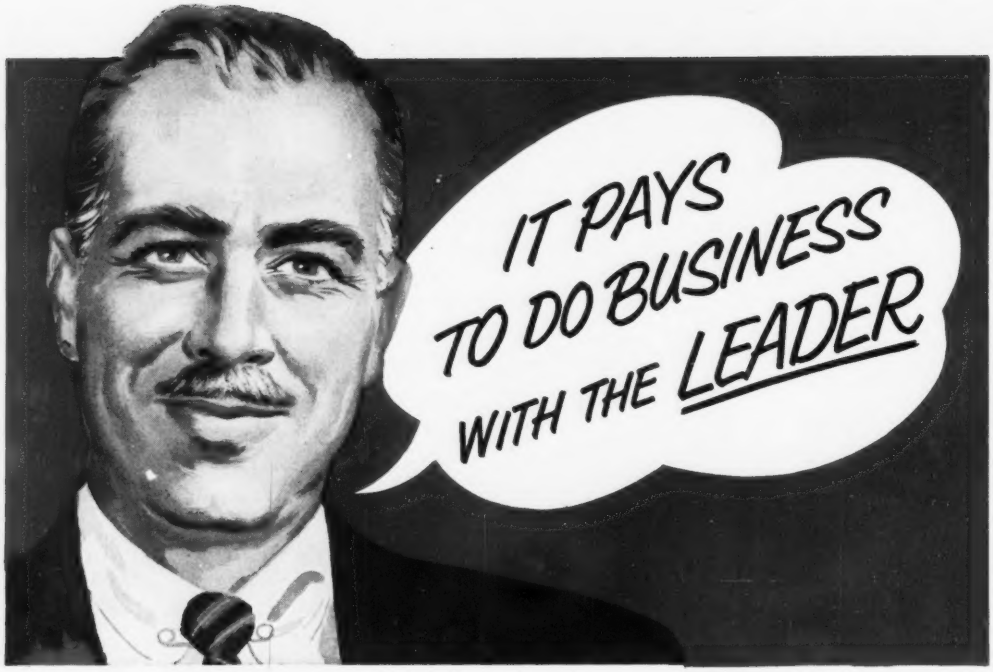

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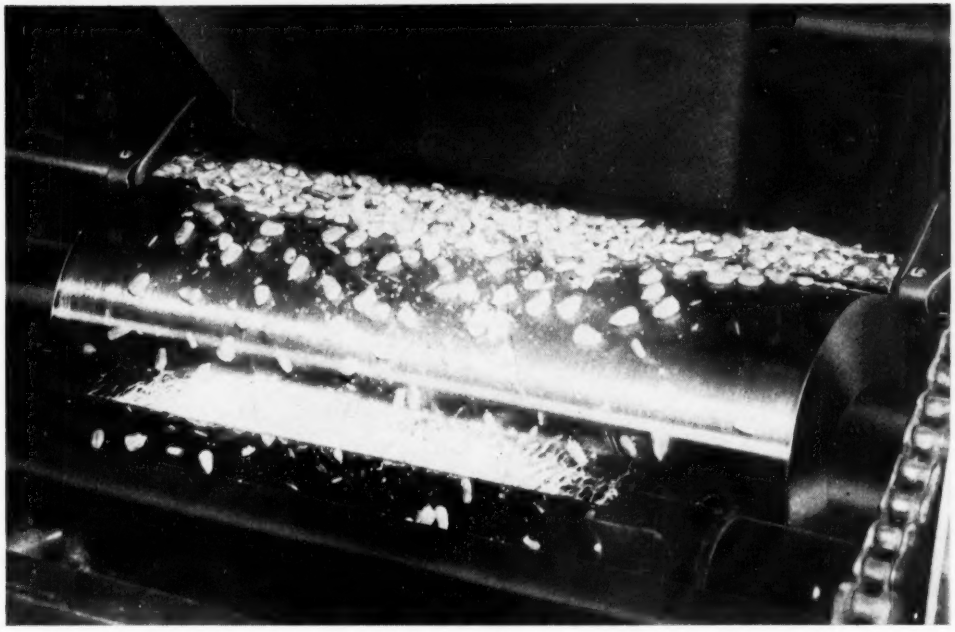


SPARKS JUMPING from electrode to roll indicate the 30,000v. electrostatic field which separates impurities from corn. This is laboratory model of revolutionary new commercial grain cleaner.

High Voltage Removes Filth

Electrostatic separator perfected by Quaker Oats bests tough corn-cleaning problem. Packaged process—seen to fit many foods—is available to industry

Editor's Note: The principle of electrostatic separation has long been held as a "natural" cleaning technique—as attested by its spectacular success in mining and air pollution control. But despite much past effort, food engineers had not previously been able to enjoy its benefits in product purity control.

Quaker Oats' innovation—a result of an expensive five years in research and development—is highly effective and commercially practicable, and it may offer an interesting enlargement of the present bounds of product sanitation. Mr. Andrews informative article tells why.

E. D. ANDREWS

Vice-President, The Quaker Oats Co., Mechanical Research Division, Akron, Ohio

It is often the *fresh* approach which packs that extra force by which industry surges over its obstacles.

A case in point is the recent development at Quaker Oats of a totally new technique for cleaning grain.

Heretofore, milling-field grading has been limited to separations based on particle size, shape, or density. But employment of a high-voltage static-discharge field now simply and practically separates impurities from corn in a continuous moving stream.

▶ Now at work in our five corn mills, this electrostatic separation process has cut impurities to an almost undetectable level. Former efficiency of removal was 90 percent.

It might first be asked why such exceptional performance was considered necessary. Isn't the grading level achieved by modern mechanical equipment satisfactory in most cases?

A review of conventional in-plant handling of corn will serve to answer these queries:

All carloads of corn shipped to mills are first graded for purity and quality by government standards. Despite this grading, a great amount of careful cleaning in the mills is still required.

Take a look at the wide variety of impurities often found in corn. The list can include cobs, cob fragments, husks, seeds, foreign grain, insect fragments, chaff, punky corn, undeveloped grain, damaged grain, stones, metallic fragments, dust and an assortment of other foreign matter, and microscopic

impurities resulting from long storage on the farm.

Small wonder that corn has traditionally been the most difficult of all grains to clean.

Mechanical Methods Used

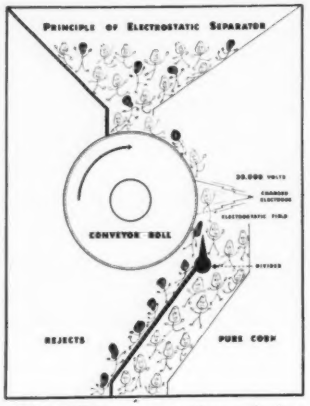
Standard mechanical systems for cleaning corn have evolved to high efficiency in recent years. Some of the more fastidious millers employ just about all of the cleaning processes available. These include magnetic separators to remove metallic fragments; milling separators and scourers to eliminate light impurities and cob bits; specific gravity separators for taking out heavy objects such as stones; a floater and washer to float and scrub off dust and dirt particles; and a whizzer to eliminate excess water from the grain.

Our own company had always worked to maintain a complete mechanical cleaning system utilizing the latest advances in this type of equipment. Yet all these processes failed to climb much over 90 percent in efficiency of impurity removal.

Late in 1946 our mechanical research department, attracted by the work of H. B. Johnson, of the Ritter Products Co., in electrostatic separation of minerals and ores, teamed up with Ritter to investigate this principle in grain separation. By early 1949 the preliminary results of this cooperative research were so impressive that we decided to take on all assets of the project—patents, personnel, equipment, etc.—and inaugurate its use throughout our plants and also eventually offer it to the industry.

Actually, the first production application for the technique was specifically aimed at the removal of rodent excreta from shelled corn. This, as all millers know, has become an increasingly serious problem due to Government crop loan policies and activities of the Food & Drug Administration. In coping with it, we had excellent results using the new process in both lab and pilot plant operations. And in the past year we have completed equally successful full-scale installations in all of our U.S. corn mills.

Basically, the process consists of the inclusion of an electrostatic separator into the flow at the end of the normal dry cleaning process. The mixture of corn and pellets which have escaped mechanical cleaning is intimately exposed to intense static discharge. The pellets, taking on a greater charge than the corn, are deflected out of the falling stream into a reject hopper, leaving the corn clean and ready for the mill.



SIMPLICITY of operating principle is indicated by this "animated" sketch.

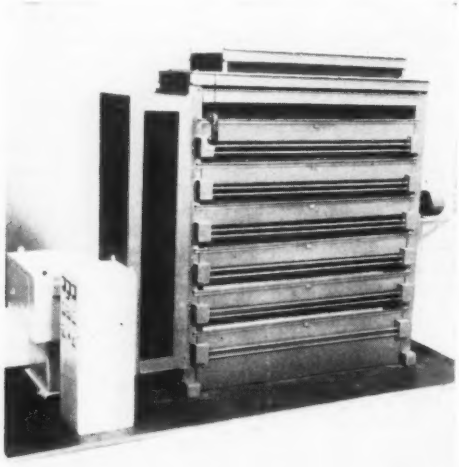
►The results achieved in improved purity in our corn products have been highly satisfactory. Microscopic examinations of many hundreds of samples, using official Food & Drug procedure, show that the new technique has practically eliminated rodent pollution in finished goods and has made it possible and practical to set far higher standards of purity than ever before.

While research tests with the electrostatic system indicate this method could effectively eliminate some cleaning steps in our mechanical system, we have chosen to retain all of this latter equipment and add electrostatic separation before the washer as an additional treatment. Utmost removal of impurities by mechanical means thus affords maximum performance of the electrostatic unit—for naturally, the purer the incoming stream, the more perfect the cleaning job.

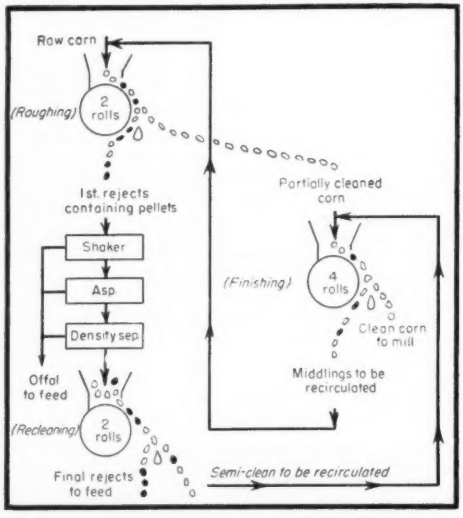
Mechanics of Unit

In actual operation, the new process involves an integrated movement of grain over several grounded conveying rolls and past electrodes charged with

(*Turn to page 163*)

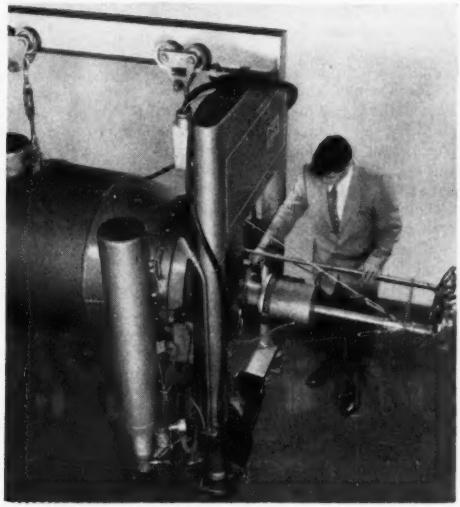


WHAT A TYPICAL MILL installation of the electrostatic separator looks like. This is a scale model of unit now available to all corn millers.



FLOW DIAGRAM showing path of corn through the highly efficient electrostatic process for removing impurities, including rodent excreta.

SYNTHETIC vitamin A in production. It is one of a long list of chemical developments important to our industry. (Photo from Chas. Pfizer & Co.)



TWO-MILLION-VOLT Van de Graaff electron accelerator for sterilizing foods without heat. (Photo from High Voltage Engineering Corp.)

WE BORROW PROGRESS From Chemical and Other Fields

Recent commercial developments and promising innovations originating outside the industry are highlighted here by a prominent food technologist

JOHN H. NAIR

Assistant Director of Research, Thomas J. Lipton, Inc., Hoboken, N. J.

From pediatrics to geriatrics, the modern American diet relies on quickly served, nutritionally rich processed foods. And the industry has developed new technology to create the specialties that cater to this demand. It also has attained production on a mass scale to keep the price within the reach of the average family.

Chemical developments and chemical engineering have played a significant role in this food progress.

Chemical developments range from growing food to packaging it. There is an array of new pesticides and herbicides—DDT, chlordane, parathion, and methoxy-chlor, to name a few. And in this area of chemical activity should be included the large tonnages and increasing varieties of fertilizers. Perhaps the most intriguing are polymerized resins that give friability and a high degree of tilth to heavy soils.

Both Packages and Products

Many contributions to the packaging of foods have been made by the chemical industry. The use of plastics for lining cans and drums has practically revolutionized their usefulness as food containers. And the new plastic films offer a variety of more effective packaging materials.

A more obscure application of chemical products to packaging is the utilization of surface-active agents in adhesive compounds. These speed sealing and extend the range of materials usable in carton manufacture. Again, chemical research in inks has made notable improvements in food package appearance.

Between insecticides and packaging materials are a host of food improvers that chemical research and engineering have made available to the food processor. Antioxidants rank high among them. Practically all animal fats contain an antioxidant, usually in the proportion of one-tenth to one part per thousand. Nordihydroguiaretic acid, propyl gallate, and butylated hydroxyanisole are three widely used.

Then there is the popular flavor enhancer MSG. Annual production of monosodium glutamate reached an estimated 8.5 million pounds and a value of 11 to 13 million dollars in 1951.

New emulsifiers and stabilizers are other results of chemical research. Combinations of polyoxyethylene glycol with sorbitol and various fatty acids found wide acceptance in the baking trade until ruled out by a standards provision (stayed by court order). Refinements in such seaweed derivatives as alginates and car-

rhogeenates have increased their usefulness as stabilizing agents. One of the latest stabilizers is an edible grade of guar seed gum, scheduled for an annual production of 250,000 lb.

Another new child of chemistry is low methoxy pectin for making jam and jelly. Satisfactory jells can be prepared with very low solids contents through the interaction of this pectin with such agents as calcium. The new process overcomes the objection to the high sugar content of jams and jellies. And inasmuch as pilot plant equipment is operating satisfactorily, it is predicted that within the year the technique will be widely adopted.

Many uses of such chemicals as sodium bicarbonate, calcium chloride, disodium phosphate, citrates, and tartrates have been standard in food processing for years. Some, such as vanillin, are added for taste, others to increase natural acidity, many to improve appearance by adding or bleaching color. Gums are added to firm some products, and sodium benzoate as a preservative.

Difficulty arises today in the use of chemical additives not previously incorporated in foods. Federal officials are becoming rather unwilling to permit ingredients of this type until they are tested by procedures which many believe to be quite unrealistic and unwarranted.

The chemical industry also is contributing importantly to better foods and food processing through development of new and more effective cleaning and sterilizing compounds. Surface-active detergents made the task of equipment cleaning an easier one, while non-ionic bactericidal compounds do the sterilizing job more effectively without damage to the metal surfaces.

Fluorides Pose Problem

One of the most controversial usages of a chemical for "nutritional" purposes is the addition of fluorides to drinking water as a means of controlling dental caries. The battle rages between the proponents and opponents of fluoridation despite the fact that it had already been adopted by a number of cities as routine.

It might be pointed out that the content of fluorides in the water supply must be very exactly maintained at one part per million. Lesser amounts fail to control dental caries effectively, while only slightly higher concentrations may build up chronic toxicities.

One interesting sidelight is that baby food manufacturers are unable to use city water supplies containing fluorides in factory operations. They cannot permit the introduction of such quantities of fluorides into the foodstuffs which they manufacture for infant and junior feeding.

Chemical Engineering Applied

Now let us consider advances in food processing for which the chemist and chemical engineer have been largely responsible. Techniques and equipment for making the highly successful frozen concentrated fruit juices are typical of achievement in this area. So also are the short-time, high-temperature processing methods and aseptic canning which improve nutritional quality, flavor, and appearance of canned foods.

Many of the practices and designs which the chemical engineer has developed for chemical processing have been adopted for the continuous processing of foods. It must be admitted, however, that the three considerations of (1) continuous flow, (2) steady-state conditions, and (3) automatic control have not always been carefully integrated in such adaptations. Too frequently, standard equipment is tied together with transfer conveyors and piping. The proper procedure is to figure the process flow, design the equipment necessary for such a flow system, and finally fit a building around the process.

Perhaps continuous methods are not used in the food industry as much as they should be because management is too conservative to adopt them. Another reason is that laboratory methods are usually discontinuous. So, when a new method is worked out in the laboratory, it is necessary to redesign the process and equipment to make it continuous for commercial application. This offers still greater opportunity for chemical engineering methods in the food field.

Revolutionary Methods

Some revolutionary electronic, antibiotic, and atomic processing methods are on the horizon.

The preservation of foods by electrically generated irradiation has intrigued many workers during the past six or eight years. Experimental treatment of packaged foods, notably milk, with X-rays at 2 m.e.v. with dosages of 100,000 to 150,000 R. have been found to prolong storage life at 10 deg. C. by a factor of 2 without appreciable change in flavor or appearance.

But only 3 to 5 percent of the primary electron energy is converted into X-rays. The balance is wasted as heat energy. Therefore, it requires 10 to 20 min. to sterilize the contents of a No. 2 tin of food. Besides, undesirable chemical changes result, and the method cannot compete cost-wise with heat sterilization.

Cathode rays are of relatively high efficiency, 75 percent of the primary electron energy being useful. In consequence, sterilization can be carried out in 1 sec. or less. However, the cathode rays are not so penetrating as are X-rays. With an energy input of 3 m.e.v., penetration is about 1 in.

Because the distance will vary with the density of the material encountered, it is natural to select a container for foods to be treated with cathode rays which will have a low density. This favors aluminum over steel.

Much experimental work has been done to determine the dosage required for sterilization of food. The unit of measurement used is the rep., an abbreviation for roentgen-equivalent-physical. One rep. is the amount of ionization produced in 1 cc. of air under standard conditions and is equivalent to 83.5 ergs per gram of tissue. It has been established that while bacteria are destroyed by cathode-ray discharge, enzymes are not affected even with high dosages.

Sterilization with cathode rays produces off-flavors in some foods, a deterioration which is thought to be related to the formation of ozone by the electron discharge. If the food is frozen, such flavor change can be prevented, but this adds considerably to the cost of the operation.

Four types of equipment have been developed for cathode-ray sterilization, all producing from 2 to 3 m.e.v., though the amount of power required varies considerably. These four types are: The Van de Graaff accelerator, the resonant transformer, the "capacitron," and the transformer rectifier.

It is estimated that the Van de Graaff accelerator, using 12 kw., will sterilize 2,850 lb. of food per hour with a dosage of 2 million reps. The biggest cost is depreciation on the equipment investment, it being calculated that the cost of operation and maintenance is comparatively small per unit of food sterilized.

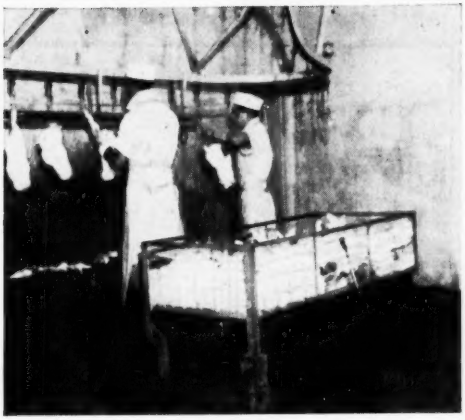
Cold electronic sterilization must be considered still in the experimental stage, since no commercial installations for food sterilization have been completed as yet.

Also still in the laboratory is the addition of antibiotics to canned foods to reduce the severity of the heat processing required for sterilization. And atomic radiation is being considered as a cold substitute for heat.

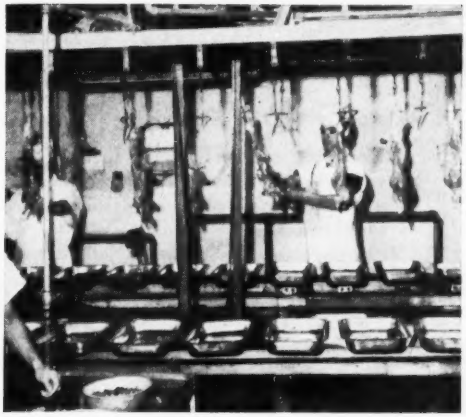
New Nutritional Concepts

Important, too, in the consideration of progress in the field of foods, are recent nutritional discoveries made by

(*Turn to page 129*)



WORKERS hang rabbits on monorail after beheading them and removing three feet (fourth is used for fastening).



PANS move in directly below each animal to hold viscera from dressing operation. Note inspector (left rear).

Rabbits Processed Poultry-Fashion

Versatile inter-field adaptability of advanced equipment is demonstrated by West Coast plant that kills, dresses, wraps, and freezes hares on continuous fowl-type production line

C. R. HAVIGHORST
Associate Editor, "Food Engineering"

Modern production line methods have now taken hold in the expanding rabbit processing industry. And most notable in this progress is the role played by advanced mechanical ideas borrowed from the poultry packer.

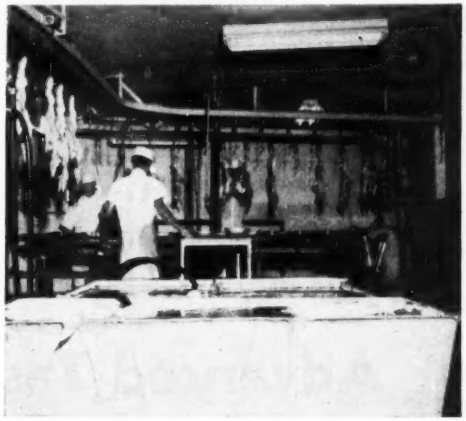
The more enterprising rabbit freezers and packers have already adapted much of the equipment used in the No. 1 poultry plants, especially that employed for evisceration and inspection.

True national tonnage of processed rabbit is comparatively small. But in Los Angeles County it has jumped to a point where it now ranks third productionwise, led only by beef and chicken.

Four rabbit does, weighing 10 to 12 lb. each, will produce more meat yearly than a 1,000-lb. cow. A good cow will wean one 400-lb. calf a year, but the four does will yield 480 lb. of fryer-rabbit in the same period—in four litters, each averaging 7 to 8 rabbits. More than 5 million rabbits are now produced annually in the Southern California area—fully 85 percent of the country's output.

Herman Pelphrey & Son, Los Angeles, front-rank freezer of rabbits can handle 5,000 whole-dressed or 2,400

(*Turn to page 162*)



THESE cooling tanks are used to quickly chill rabbits before they're sent to refrigerated rooms.

WHOLE, dressed animals are wrapped with locker paper, then go into —25 deg. F. room (at right).

Approach to the Elusive

Attainment of reliability in consumer-preference evaluations of foods continues to be a troublesome problem, despite the various attempts at solution.

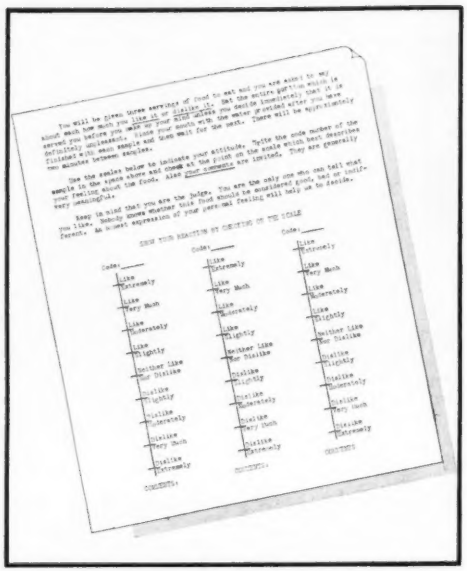
***First,* there has been general failure to achieve standardization.**

***Second,* this failure has fettered development of confidence on the part of potential testers.**

With a practical answer still elusive, the immediate logic is to entertain some partial solution that shows promise of lending stability.

Accordingly, the hedonic scale system is here advanced as a technique which may very well prove to supply this needed foundation for development of tomorrow's consumer preference methods.—*The Authors*

Lab Form Employed



QUESTIONNAIRE used in laboratory to judge specific food preferences with the hedonic scale method. Tester checks point which best describes his reaction to food.

QM Pins Food "Likes" and "Dislikes" With

Advanced Taste-Test Method

Small differences in similar foods, gross differences in checking general overall preferences, and group attitudes toward foods are now being quantitatively pegged using this hedonic scale adaption

DAVID R. PERYAM and NORMAN F. GIRARDOT
Quartermaster Food & Container Institute, Chicago

A technique has been developed at the Quartermaster Food & Container Institute which, we feel, offers notable progress in evaluating consumer preference of foods. It has been labeled the "hedonic scale method."

This basic approach is not new, since the method uses a variant of the well-known rating scale, introducing the hedonic value concept, which refers to the psychological range of "unpleasant" or "dislike" at the lower end to "pleasant" or "like" at the upper end.[1]

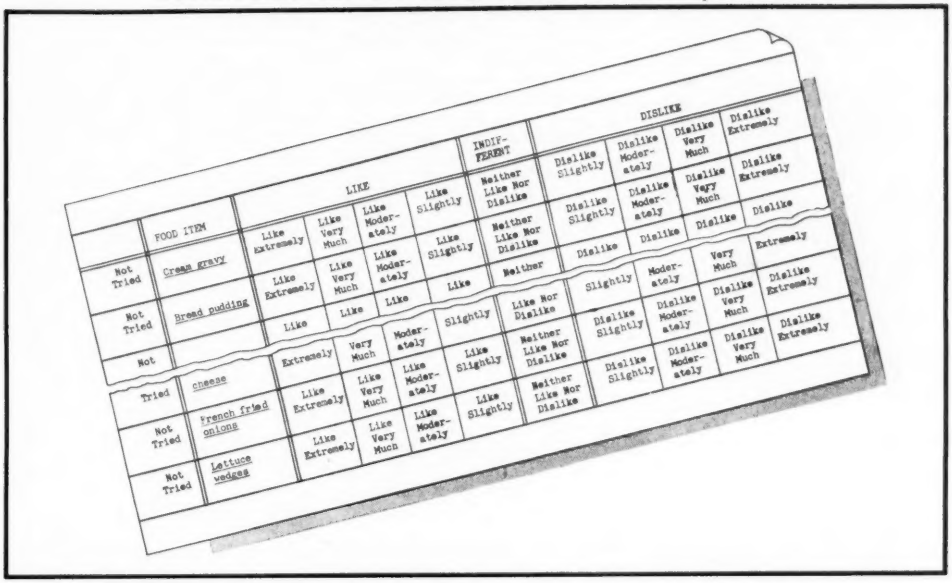
Also, the problem of quality control of food flavors is completely divorced from this technique—thus keeping the analysis of consumer preferences on a separate plane.

This type of scale was first tried at the Institute in a comparison of methods of predicting soldiers' food choices. Results were encouraging, and in 1949 its suitability for the study of relatively permanent preference attitudes toward food was demonstrated. It was also shown to be adequate for laboratory use in measuring the response to foods as eaten. Forms and procedures were developed for both situations, and since then both kinds of applications have been used constantly.

The hedonic scale method is not considered a polished system, because pertinent questions as to its interpretation, its reliability, and the extent of its usefulness are as yet unanswered. Unquestionably, it can be improved. But it is described here in its present form because of the interest that it has aroused among many people concerned with preference evaluation of foods.

To present the hedonic scale method in terms of a set of rigid specifications would misrepresent the

Field Form Names Foods, Can be Used Any Time



	FOOD ITEM	LIKE				INDIFFERENT	DISLIKE			
Not Tried	Cream gravy	Like Extremely	Like Very Much	Like Moderately	Like Slightly	Neither Like Nor Dislike	Dislike Slightly	Dislike Moderately	Dislike Very Much	Dislike Extremely
Not Tried	Bread pudding	Like Extremely	Like Very Much	Like Moderately	Like Slightly	Neither Like Nor Dislike	Dislike Slightly	Dislike Moderately	Dislike Very Much	Dislike Extremely
Not		Like	Like	Like	Like	Neither	Dislike	Dislike	Dislike	Dislike
Tried	cheese	Extremely	Very Much	Moderately	Slightly	Like Nor Dislike	Slightly	Moderately	Very Much	Extremely
Not Tried	French fried onions	Like Extremely	Like Very Much	Like Moderately	Like Slightly	Neither Like Nor Dislike	Dislike Slightly	Dislike Moderately	Dislike Very Much	Dislike Extremely
Not Tried	Lettuce wedges	Like Extremely	Like Very Much	Like Moderately	Like Slightly	Neither Like Nor Dislike	Dislike Slightly	Dislike Moderately	Dislike Very Much	Dislike Extremely

IN FIELD, preferences are registered on forms like this one—usually with nine items to be reviewed at one time. This type check-sheet was designed for studying soldiers' preferences either a few minutes or several days after eating foods under question. In scoring, each scale point is given a number.

situation—since questionnaire forms can vary, and considerable latitude is allowable in the test. Forms and procedures now in use at the Institute will serve as a basis for this description, with the critical features being emphasized and the points of permissible variation indicated.

In the standard questionnaire form used for laboratory consumer preference evaluations, two main parts may be recognized—the instructions and the scales. Instructions are generalized, without reference to any particular food, and with provision for a maximum of three test items.

When the questionnaire is designed to measure general attitudes toward foods, the scale may be presented in a much different form for a larger number of items. However, all forms are the same in the following two respects: The phrases which describe the scale points do not change, and they are always placed so their continuity will be seen.

The method is designed for use with observers who are entirely without experience in food testing. Both the instructions and description of scale points are written with this purpose in mind. However, there is no evidence that the resulting simplicity reduces its effectiveness with other, more sophisticated observers.

The instructions have two functions: One is to tell the observer what he must know, or what the experimenter wants him to know, about the mechanics of the test; the other, and more important function, is to encourage him to report his immediate naive response without any conscious effort to remember or to judge. The simple "like-dislike" description of the scale further encourages this tendency.

Oral instructions can be fully adequate, and they are desirable if the test situation permits individual contact with each observer as in the laboratory. But sometimes the only contact will be through the questionnaire, hence instructions must be carefully written.

No evidence so far available has shown that the geometry or arrangement factors of the scale are very critical, although these have not been intensively investigated. Adjustments are often made for such factors, how-

SOLDIERS test coffee in mess hall at Fort Bragg during a recent field test conducted by QM Board. Immediately after finishing, men rate each sample on hedonic scale questionnaire. (Department of Defense photo)

ever, in developing rating scales for other purposes.[8] Laboratory and field forms seem to work equally well. The vertical scale on the laboratory form is to give the idea of a continuum with equidistant points, but there is no proof that this has any definite effect. Apparently most observers consider the laboratory scale only as a series of categories—the same as in the field form.

The lab scale is normally presented with the "like extremely" category at the top or left. But reversal of both the horizontal and vertical scales has been tested and no definite differences have been found. Also, the physical size of the scales has varied from 5 to 7 in. Probably extreme variations in scale size would affect results, although this has not been experimentally determined.

The Taste Tester

Selection of test people is of great importance to interpretation of the results. However, the adequacy of the method does not depend too heavily upon this. The objective is to measure group responses toward foods. Whether or not the group tested represents the consumer group in which we are interested, or whether it represents any group at all, must be determined independently of the test itself.

The number of people required for a given test cannot be arbitrarily stated, but must be determined by the experimenter by the nature and importance of the problem and the degree of precision desired in the results. In the laboratory, the number potentially available usually influences that decision, too.

Variability in ratings from a group of observers tends to be high but also tends to be fairly constant. Thus, it becomes possible to estimate with some accuracy the number of observers necessary to assure statistical significance for a given scale-point separation between two test foods. Because of this high variability, the scale is not suited for use with very small panels—the standard number of observers for tests at the Institute being 40, although this may be increased for important problems. The number of respondents in a field test is usually determined by criteria other than the desired precision of the results.

The tester in the laboratory receives a maximum of three foods at any session. He is instructed to rate each food as he finishes it, and to rinse his mouth with water between samples. Further, he is asked not to change a rating once it has been made. This is done to encourage him to consider the foods independently of one another. Whenever more than one sample is presented it must be assumed that ratings may mutually influence each other.

It has been demonstrated that there is a definite contrast effect when foods being tested lie far apart on a scale.[8] Presenting only one sample at a session would prevent this but is wasteful of laboratory and observer time. Note that later samples cannot affect the earlier ratings except for the occasional observer who fails to obey instructions. Forward-acting effects are equalized by varying the order of presentation of the samples.

The laboratory test situation is designed for optimum sensory discrimination, and the observer's immediate impression is recorded with no opportunity for a memory lag. In field testing, this cannot be done too often. The respondent will usually eat the test food along with other foods as part of his normal meal, and then be asked to comment on it anywhere from a few minutes to several days later.

Thus, when general preference attitudes are surveyed, the delay factor becomes even more important, with the possibility that the respondent may answer from experiences which he could not remember even if he tried. Therefore results of laboratory tests have been found to be more reproducible than those of field tests.

Checking the Data

Two approaches are used in analysis of the data. Each results in a kind of "preference index."

In the first approach, numbers from 1 to 9 are assigned to the scale's nine categories and the data then treated quantitatively. The numbers may begin at either end of the scale, but to have high numbers reflect preference, 9 is usually assigned to the "like extremely" end. Score distributions are then dealt with by usual statistical procedures. Calculated are means, standard deviations, standard errors of the means, and the significance of differences between means. And both scores and means may be treated by analysis of variance.

The validity of using certain of the statistical methods with data of this type is questioned by some statisticians. But analytical methods are required and use of the normal procedures is justified on practical grounds until more appropriate techniques become available. The mean rating is the statistic most often used at the Institute, being reported as the major test result.

The second approach provides an index which is probably as useful as the first for the practical purpose of describing a group response to a food. Statistically, it is more respectable, since it deals only with the percentages of responses falling into the various categories. However, unless the number of observers is large, the percentage of responses in some of the categories may be zero, or very close to it. Then it is more convenient and meaningful to combine the categories.

One grouping which has self-evident validity is a combination of the four categories of "dislike." This statistic is always calculated by us and reported along with the mean rating. Also, the percentages falling into single categories, such as "like extremely" or "dislike extremely," may be useful in special analyses.

Results for four foods which were tested at different times in the laboratory are presented in Table I. The entire distribution of responses is shown, along with the statistics which are usually calculated. Food A's rating is unusually low, and that item would be considered nonacceptable under any circumstances; food D has one of the highest ratings ever obtained in the laboratory tests. Of the other two, B would be considered "poor" and C, "good."

The broad distributions of responses and the resulting high standard deviations that occur with all of the foods except D are typical. They do not necessarily indicate lack of precision in the method, but reflect the fact that there are normally wide differences among people in their feelings about foods.

Adequate Accuracy

Questions of both theoretical and practical importance should be asked about any new and relatively untried method. These concern its reliability, its precision of discrimination, and its validity for various purposes.

Experimental evidence in regard to the hedonic scale method is far from adequate, but inferences can be drawn from results obtained over its two-year period of use in our laboratory. This evidence suggests that the mean hedonic rating from as small a group as 40 observers will have satisfactory stability.

However, we may look at the question of stability in two different ways: First, how reproducible is an individual rating, or a mean rating, when a test is repeated under identical conditions?

Three ration items were rated by 35 observers and the test repeated three weeks later without their knowing that the same items were involved. The sets of individual ratings corre-

lated very well and all the mean ratings were reproduced within 0.2 scale points. Under these conditions there seems to be little question about the reproducibility of results.

Second is the point that for practical work, one wants to know what happens when conditions are not as carefully controlled. And here, even under ordinary conditions, mean ratings have been found to be stable enough to give the impression that a constant property of the food is being measured. Results will generally fall within the narrow range of values permitted by the experimental error.

Table II shows results obtained upon repeated testing of four foods by groups of 40 each. Some of the tests were widely spaced in time, the combinations of foods served were not constant, and the groups were never the same, although they were drawn from the same population. Presumably, the quality of the test foods remained the same, though slight variations may have occurred.

Statistical methods were used to find out whether the observed differences between ratings for a food were due to chance. The actual ratio of the range of mean ratings to the average standard error for each food is shown in the column, "Range/Standard, Actual" of the table. The expected value of this ratio for any given number of test repetitions, in situations where only chance is operating, may be calculated by statistical methods.[4] These values are shown in the column, "Range/Standard, Chance" of the table.

In only one case does the actual ratio appreciably exceed the chance ratio. This suggests that most differences will be accounted for as normal chance variation and that the test is inherently reproducible.

Precision of discrimination with a rating scale, is determined by the scale distance between mean ratings, the variability within the distribution of individual ratings on each item, and the number of observers used in each test. If the scale is measuring hedonic value at all, and if there is a true difference in group response toward the test foods, the difference can be proven simply by increasing the number of observers as necessary.

What Scores Mean

Approximately, 2,000 tests run in the Institute laboratory on over 100 different items have shown a total range in mean ratings from 2.9 to 8.5. Generally, mean ratings below 5.0 represent either poor quality foods or foods that are strange to the observers, while those over 7.5 are obtained for good quality samples of highly popular foods, such as ice cream and candy.

Most foods fall in the range of 5.5 to 7.5, with variability among individual ratings tending to be high. The standard deviations shown in Table I for foods A, B, and C are typical. When variability is of this order and the observer group consists of 40 persons, differences in mean rating of about 0.8 scale units will usually be significant in the sense that they will be reproducible about 95 percent of the time.

Theoretically, then, at least six mutually exclusive levels of hedonic value could be established over the total range.

The hedonic scale rating reflects the attitudes of a group of people toward certain foods and under a given set of conditions. How well the observers and the test conditions represent any practical use situation will depend upon the adequacy of the test plan and the sampling procedures.

Since the hedonic scale method creates no unique problems in this regard and has no special limitations, the factors affecting its validity will not be discussed in detail. However, the ease with which the scale is understood by most people, and its fairly good observed reliability, suggest that in regard to validity for uses involving prediction of consumer preferences it will certainly be as good as other available methods.

Experience to date has shown certain purposes for which the hedonic scale method is valid if the sampling of observers is appropriate and the tests are properly run. These may be summarized as follows:

1. To detect small differences in the direct response to similar foods.

2. To detect gross differences in the direct response to foods, even when time, subjects, and test conditions are allowed to vary.

3. In field questionnaire surveys, to reveal differences in group-preference attitudes toward foods.

A fourth purpose may be included, but with some reservation. This is to make general predictions, on an absolute basis, about the acceptance level of any food.

But many people who are not familiar with the problems of preference measurement tend to consider the indices derived from this scale as if they were fixed and unchangeable indicators of acceptance. Available evidence does not bear this out. Even though ratings have a certain stability, they will vary with such factors as the psychological and physiological state of the consumer.

Obviously, they may also vary according to the type of consumer group tested. Thus, it is undesirable to try to establish or use fixed standards of interpretation. For example, mean ratings below 5.0 are usually obtained only for poor quality foods, but it cannot be categorically stated that this number marks the boundary between "acceptable" and "non-acceptable." Exceptions have been found where foods which rate below 5.0 show satisfactory field acceptance.

Another caution is also in order: The hedonic scale method cannot be considered for quality control of flavor in food production. Even though the method has been discussed only in relation to the measurement of preferences, this caution is believed necessary, since the two problems are not always recognized as being essentially different.

(Turn to page 194)

TABLE I—DISTRIBUTIONS OF RESPONSES on Hedonic Scale, With Resulting Statistical Indices for Various Food Items

Scale Point Description	Assigned Value	Frequency of Responses			
		Food A	Food B	Food C	Food D
Like Extremely	9	0	0	9	11
Like Very Much	8	1	5	12	21
Like Moderately	7	1	11	7	8
Like Slightly	6	8	4	7	0
Neither Like Nor Dislike	5	3	3	2	0
Dislike Slightly	4	4	6	0	0
Dislike Moderately	3	6	6	0	0
Dislike Very Much	2	10	5	2	0
Dislike Extremely	1	7	0	1	0
Total Responses		40	40	40	40
Mean Rating		3.48	5.20	7.08	8.08
Standard Deviation		1.99	2.04	1.93	0.68
Percentage "Dislike" Responses		67.5	42.5	7.5	0.0

TABLE II—REPRODUCIBILITY of Hedonic Scale Results, With Groups of 40 Observers Repeatedly Testing From Foods at Different Times

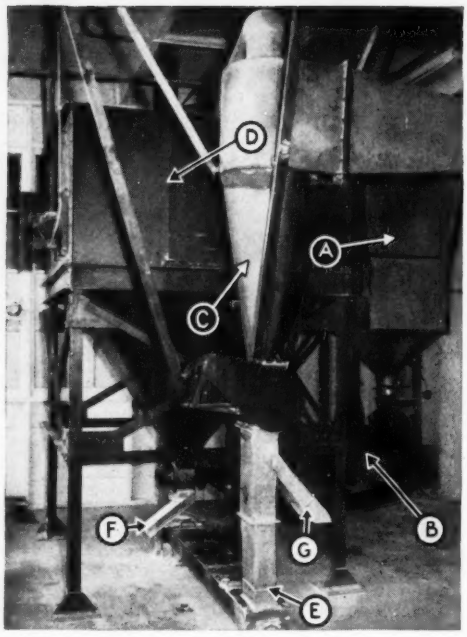
Food	Number of Tests	Analysis of Mean Ratings				Range/Standard Error	
		Lowest	Highest	Range	Standard Error [1]	Actual [2]	Chance [3]
Fresh Milk	11	7.02	7.88	.86	.19	4.5	3.4
Lemonade	4	6.60	7.29	.69	.32	2.2	2.6
Canned Bread	8	6.09	7.05	.96	.25	3.8	3.2
Pea Soup	6	7.08	7.65	.57	.22	2.6	2.9

[1] Average of individual standard errors of the means.

[2] Figure of Column "Range" divided by figure of Column "Standard Error."

[3] Expected value of ratio if all differences between means were due to chance.

CONVENTIONAL WAY: Blend comprising chocolate liquor and such ingredients as sugar, milk solids, and salt, requires several stages of refining. Material goes through rolls (left) and conches (right).



NEW WAY: Chocolate is now made from roasted beans in continuous 1-step operation. Coarse ground ingredients are blended in ribbon mixer and charged into hopper (A) that supplies needs for several hours, thus freeing operator for other work. Ingredients feed to Mikro-Atomizer (B), which connects to cyclone collector (C) and Sly dust collector (D). Finally, pulverized mix is discharged via outlets (E) or (F). Chute (G) is for drawing off material for making small batches.

Radical Pulverizing Technique Short-Cuts Chocolate Refining

LLOYD E. SLATER
Assistant Editor, "Food Engineering"

When a researcher finds himself stymied in a specific effort, he will often dream up some very ingenious use of odd process equipment to speed him to his goal. Then, when the hurdle is thus surmounted, the incident is likely closed with a mere "That's that."

It is much wiser, however, to pause and give this kind of inventiveness close scrutiny—for the researcher's coup may prove to supply yet another basic link in the chain of process advances now rapidly pulling the food industry from its old engineering doldrums.

Take, as a case in point, the inspired work of Justin Alikonis, chief chemist of the Paul Beich Co., Bloomington, Ill. During World War II, he was working to improve chocolate coatings for military ration candy. But the time and cost of testing out new ideas on conventional chocolate equipment dampered his progress.

What he needed was a way to run small chocolate samples fast. Yet results had to compare closely with commercial samples.

To expedite his project, Alikonis turned to the unusual—experimented with an air-flotation type pulverizer as a means of preparing dry coating ingredients. And he discovered that the finely divided particles from this unit blended homogeniously with chocolate liquor—and without further refining.

Here was a successful "makeshift" system for producing coating samples quickly and cheaply.

But then this inventive researcher and his company colleagues took a closer look—and found that they had much more than just a clever sample-making system. What had actually been hit upon was a basic process innovation with far-reaching possibilities in confection manufacture.

With the war's end, Alikonis investigated the likelihood of in-plant use of his pulverizer technic. The upshot was a complete upheaval in Beich's time-honored way of making chocolate, plus three recently issued patents which add up to a major advance in chocolate technology.

Advantages Cited

Most startling aspect is the process's ability to make fine chocolate directly from roasted cacao beans in a continuous, one-step operation—thus abolishing several grindings and three lengthy batch refining operations normally employed. However, its broad capabilities are best reflected in these five benefits at Beich's:

▶ Floor space—Saved 80 percent from former operation by eliminating refining equipment.

▶ Manpower needs—Reduced from 11 to 2 men for equal output.

► **Process-power requirements—Trimmed from 336 to 125 hp.**
► **Control—Provided new precision in achieving chocolate-coating fineness.**
► **Production—Expedited output of heat-stable military-type coatings.**

Before elaborating on the performance of the new equipment as installed at Beich's and several locations overseas, let's first consider the problems solved in developing the basic pulverizer concept.

Back when the original problem arose—the need for fast preparation of small samples—the coatings were being tediously made in 500-lb. lots requiring several days of refining. Involved was the usual method of adding dry ingredients—such as sugar, milk, solids, salt—to chocolate liquor, and then passing the blend through melangeurs, refiners, and conches.

At this time, the company installed Aloxite stones in its grinding mills capable of producing an unusually fine chocolate liquor—one going through 325-mesh screens. Alikonis reasoned that if dry ingredients could be reduced to particles equally fine, they should incorporate into liquor by agitation, without further refining.

Air-Flotation Approach

A logical contender for the job seemed to be an air-flotation type pulverizer. Selected was the Pulverizer Machinery Co.'s "Mikro-Atomizer," combining conventional hammer-mill action with a fan-created air stream moving in opposition to the centrifugal flow of ground material. Thus, fine pulverized particles leave the unit with this air stream, while the heavier, larger ones fall back by centrifugal force for regrinding.

With this pulverizing unit, ultrafine particles were possible—those less than 25 microns in size. But in this highly dispersed state, the dry ingredients leaving the pulverizer adhered and formed agglomerates. This objection was overcome by regulating the air volume and delivering the fine particles directly into liquor.

Initial laboratory runs proved that the new, quick process produced coating samples equal in flavor, texture, and stability to the best efforts of the standard refining setup. Furthermore, it was now possible to run 1-lb. batches of a new formula at a moment's notice. Needless to say, the development greatly accelerated the progress in coating research.

During the war, plant space was at a premium, so it appeared logical to promptly test the new technic on a commercial scale. If successful, valuable space formerly occupied by sizable refining equipment would be freed, and the much needed increase in capacity could thus be obtained.

Consequently, a No. 6 Mikro-Atomizer with a 6,000-rpm. rotor, 24 separator blades, and a 6-blade fan was installed. Pulverizing capacity was slightly over 600 lb. of drys hourly.

A system was set up supplying dry materials via a ribbon mixer and bucket elevator to a storage hopper directly over the pulverizer. This latter hopper operates for several hours unattended, being uniformly discharged by a vibrating feed.

Material is moved directly from the pulverizing unit through an exhaust air line and an air lock and into liquor-bearing Stehling tanks on the floor below. However, about 3 to 15 percent of the material was found to remain air-suspended, so it was then necessary to blow air laterally through an adjacent automatic unloading dust collector.

In the in-plant system, it was also found necessary to transfer pulverized ingredients directly into liquor to prevent agglomeration. The Stehling tanks are conventional, stirrer-equipped, jacketed units, each holding 12,000 lb. of chocolate. In operation, these tanks are filled, through pipe, with a proportionate amount of chocolate liquor plus such other materials as lecithin and cocoa butter.

Direct incorporation of solid ingredients, followed by a period of mixing, was all that was needed to ready a Stehling-tank charge. The chocolate could then be pumped through heated pipe to enrobing units.

How Quality Jumped

The new process "took hold" with minimum snags, but even so its enthusiastic inventor was unprepared for the consistent quality boost it produced. First, it brought a completely new standard of texture fineness to coatings. This was attributed to sugar particles of less than 25 microns. In conventional refining, some particles over 200 microns escape grinding.

Another interesting "bonus" was the effect of adding large quantities of air with dry ingredients into the liquor. This aeration gave the chocolate superior taste and aroma. It was reasoned that additional flavor was developed by certain chemical changes, such as oxidation of the cocoa tannins and carmelization and inversion of sugars.

Still another explanation accounts for superior flavor in the new process. Apparently, fine sugar particles drive off moisture when added to liquor and eliminate a sizable quantity of volatile acid. As a result, there is a corresponding decrease in residual harshness and acridity normally contributed by chocolate liquor.

Finally, coatings made with ultrafine particles showed promising resistance to heat and bloom. Reason: Each sugar particle is actually coated by a thin film of cocoa butter. And naturally, more particles with more surface area will, correspondingly, tieup more bloom-producing fat.

One-Stepping It

As dramatic a process simplifier as the new technic was, Alikonis still saw possibilities for ultimate omission of other steps in chocolate making.

"Why not," he reasoned, "add the cacao nib itself as a dry ingredient? Then it wouldn't be necessary to employ a series of mills, as heretofore employed, to reduce nibs to liquor."

True, grinding of cacao nibs in similar pulverizing equipment had been previously attempted. However, the high percentage of fat in the nibs—usually over 50 percent—always caused clogging at temperatures over the melting point. To cope with this, a housing was placed over the new pulverizer and refrigerated air was fed into its chamber to keep temperature below 78 deg. F. When the nibs, mixed with other dry ingredients, were then fed in, there was produced an extremely fine powder which could be directly incorporated into liquid ingredients to make a chocolate product without further processing.

- **Lengthy batch work is abolished in novel process engineered by Midwest technologist**
- **Furthermore, new method can be employed in a simple 1-step operation**
- **And it's seen bringing chocolate making within the scope of average-size plants**

Operating Closeup

The advanced Beich production line that changed yesterday's prolonged, multi-step chocolate refining to today's streamlined process is graphically detailed in this month's special FE Foldout Picture-Flowsheet — on pages 116-119.

Several important details had to be worked out before this simple, one-step process could be perfected. First, stricter control had to be exercised in bean roasting—a medium roast was needed, with a finished nib-moisture content not exceeding 3 percent. Higher moisture levels made the nibs excessively tough.

Proper cooling during pulverizing posed a second problem. Without cooling, it was easy for the product to go to 115 deg. F. or higher, thus quickly clogging the unit with fat. To keep operating at reasonable capacity, it was necessary to supply 1,500 cu. ft. of 50-deg. F. air. And a supply of the same cool air also had to be directed into nibs feeding the machine.

Interestingly enough, the one-step process was discovered more suited to making a complete chocolate product than as a simple substitute for conventional chocolate-liquor grinding. Apparently, the relatively coarse ingredients have a scarifying and abrading action on the nibs, retarding gumminess. And any small quantity of liquor produced by momentary melting is readily absorbed by coarse materials.

Indicated for Average Plant

While these results were very rewarding, it was not seen justifiable to go over completely to this simplified operation in the Beich plant. First of all, the company had put in an excellent series of three Aloxite triple mills, capable of producing over 600 lb. of fine chocolate liquor per hour. Use of these units in conjunction with an ingredient pulverizer resulted in an added capacity of almost 30 percent over a one-step operation on the same product. And power requirements for the necessary refrigerated air were far more than the cost of running the Aloxite mills.

However, this one-step process should be attractive to average-size confectioners and notably those just getting into chocolate production. The simplicity of operation and saving in space are indicated as prime advantages in such plants.

But on the basis of operating data, Alikonis advises that it would be more economical in the long run to purchase liquor-grinding equipment—unless the manufacturer has a cheap source of electric power or excess refrigeration.

Power costs of the one-step process vary with the composition being run. In a milk chocolate with, say, a 10-percent nib component, a temperature of 78 deg. F. is acceptable in the pulverizer. However, as the nib percentage increases there is a corresponding need for lower temperatures to compensate for additional fat.

The process does, however, play a role in present commercial operations at Beich. When dry powdered cocoa is readily available at a good price, it can substitute for cacao nibs to produce a complete coating. And, since commercial cocoa powder has a low fat content, there is no need for expensive refrigeration to prevent jamming. Cocoa butter or vegetable oil is added during mixing to build up fat content of such coatings.

Use of dry powdered cocoa in the process has opened up a new field in development of compound coatings. It has resulted in the substitution of vegetable fats for cocoa butter in some coatings. And it has expedited production of acceptable chocolate having less fat content and less tendency to bloom.

Mute testimony to the effectiveness of Alikonis's current work along this line is that Quartermaster Corps taste panels have shown over 80-percent acceptance of the new temperature-resistant coatings.

Another Alikonis observation led to further improvement of his versatile process—its ability to control sieve size of component particles.

He asked himself: "Since the normal human palate rarely is able to detect particle sizes smaller than 100 microns, is it really necessary to go to such extreme size reduction to make a commercially acceptable product?"

Tests with particles out of sub-sieve range confirmed his speculation. The product compared favorably with older refining methods. But valuable advantages were also noted. For one thing, grinding at an increased particle size almost doubled process capacity.

Primary advantage turned up in the product itself. Sub-sieve particles increased coating viscosity which, in turn, required more cocoa butter in the composition. By controlling particle size, it was possible to substantially reduce the fat.

Operating Rules

To control particle size, the inventor made certain modifications of internal structure in the grinder, and he also outlined some definite operating rules.

By slowing rpm. from 6,000 to 5,000, less reduction of particles to sub-sieve size occurred in the pulverizer housing. Toward the same end, the number of separator blades in the unit was reduced and space between them increased. Meanwhile, to get more air pressure to carry out larger particles, the number of blades in the pulverizer fan was doubled.

While these changes immediately brought the ground particles within sieve range, their larger mass caused a tendency to clogging around the fan. To deal with this, a rearward bevel was made in the fan blades so rotation would free any adhering particles. Further, a slight negative pressure—from 1 to 6 in. of water—was set up in the dust collector by a blower unit so that there would be an additional "pull" on these larger particles to leave the pulverizer housing.

With the above basic modifications, it was possible to control particle size from sub-sieve to practically any sieve range desired. Actual regulation is a matter of varied speed in the pulverizer and the amount of negative pressure imposed on the off-duct system.

Typical of the new productivity was a ground mass which would all pass through a 100-mesh screen, 97 percent through 200-mesh, and 85 to 95 percent through 300-mesh. And through-put was twice that chalked up in former 25-micron grindings—approximately 1,110 lb. per hour of a pulverized sugar-mill mixture, as against the former 620-lb.

Patents and Commercialization

Impressive results of his basic pulverizer experiments led the inventor to apply for a U. S. patent in early 1946, and it was granted (No. 2,459,908) on Jan. 25, 1949. In addition, his later developments of a one-step chocolate making process and a means for classifying chocolate product particle size were also subsequently patented (respectively, Patent No. 2,465,828, Mar. 29, 1949, and No. 2,574,948, Nov. 13, 1951.) All are assigned to the Paul F. Beich Co.

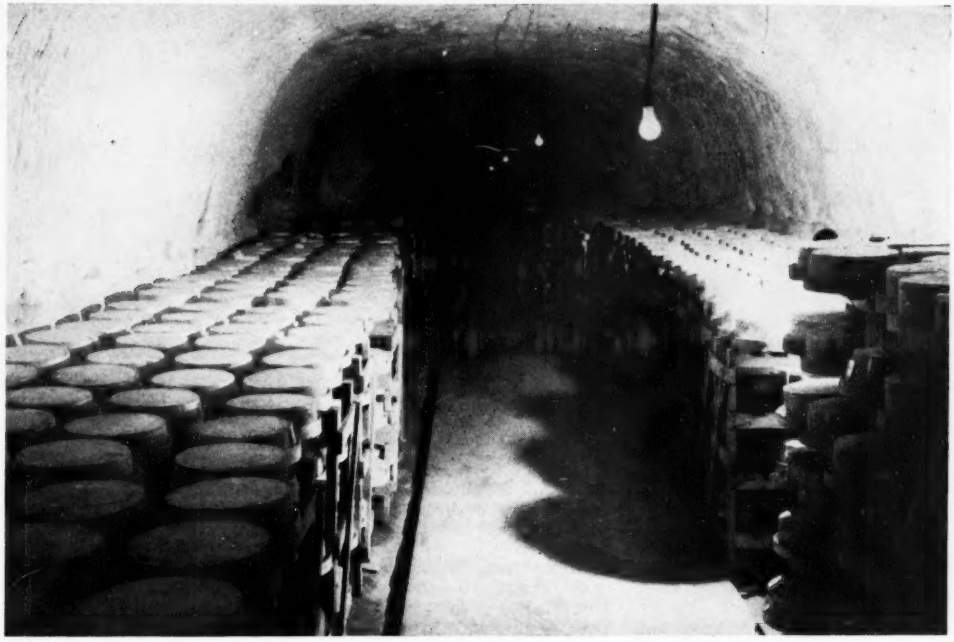
With his patents pending, Alikonis took a first step toward commercializing his discoveries by consulting with various European confectioners who were interested in his process. Installations then followed in Holland, Belgium, and France. And recent reports from abroad indicate the new technique is flourishing, with one group already planning further expansion.

Adoption of the method primarily involves buying process rights from the Beich organization. This includes technical consultation with Alikonis on selection of equipment, modifications as may be required, and initial operation.

Current marketing: A contract is now being considered by an Australian company, hence the process should be operating "down under" by the end of '52. Also, negotiations are in progress in England, Switzerland, Greece, and Western Germany.

(Turn to page 134)

Turn page →



1 **CAVE STORAGE** of more than 1,000,000 lb. of cheddar is required in order to insure an adequate supply of the various ages and types needed to maintain uniformity in the plant's large daily production.

4 Factors That Spell

Uniform Processed Cheese

Prime attention to bulk supply, to blending, and to processing—backed up by hawk-eye control—gives Land O' Lakes top-grade product in 100,000-lb. daily runs

BEN M. ZAKARIASEN

Manager, Laboratories and Field Service, Land O' Lakes Creameries, Inc., Minneapolis, Minn.

Subtle differences in natural cheeses due to locale, ripening method, and acid development, may please the occasional gourmet. But they hardly contribute to repetitive purchases by consumers at large.

Process cheese manufacture overcomes this lack of uniformity. Yet here, oddly enough, the same incalculable qualities that are factors in the bulk products also greatly complicate what could otherwise be a straightforward blending and cooking operation and make production of the processed item a skilled undertaking.

At Land O' Lakes, processed cheese has grown to be a major part of the business—current output now exceeding 100,000 lb. daily. To achieve this through-put and still hold our product at optimum quality from day to day we stress four basic factors:

1. A varied and sizeable bulk cheese supply.

We make an effort to maintain over a million pounds of various-age cheddars in storage.

2. Full services of a skilled blender.

Proper blending is an art demanding considerable experience as well as technical "know-how."

3. A smoothly engineered processing system.

Since operations are, necessarily, batch-continuous, they require well-meshed sequencing.

4. Careful integration of quality control with production.

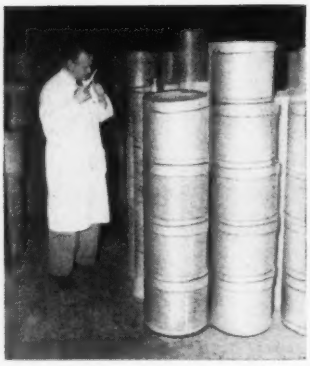
A running series of tests prevents uniformity from straying and catches any process errors.

All four of these factors have one target—product uniformity. To understand their undividual influence, and get a picture of their cumulative effect, let us consider each factor at length.

Experience has shown that suc-

→ continues through

2 **INCOMING CHEESES,** after having been graded for body, texture, and flavor, move on this inclined belt conveyor to 40-deg.-F. master storage.



3 **BLENDER** selects cheeses for day's run by sampling in master storage. Then hoops go to 70-deg.-F. room for 72-hr. tempering period.

4 **BATCH** is wheeled to process feed-in station, where cheeses are unhooped and check-weighed, then go to cleaning room.

cessfull blending of a batch for processing requires at least three, and often up to a dozen, different kinds of bulk cheese. Further, it is desirable that supply cheeses come from as widely scattered factories and localities as possible.

Cheese for the blend can be used in three stages of aging. A small amount of "current" cheese—not over 30 days old—is used to impart a cohesive quality to the product. However, if this cheese tests acid, it is unusable due to its discoloring effect.

"Short held" cheese (from 1 to 6 months in age) usually constitutes the major part of a blend. It is important that the body of such cheese is smooth without the rubbery texture found in the current type. If improperly textured, short held cheese must remain in storage.

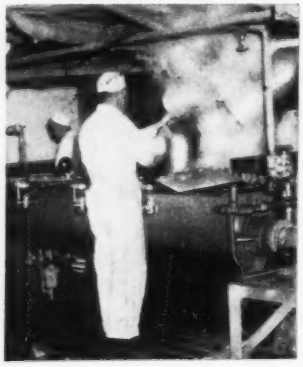
Third type for blending is "storage cheese" (aged 6 months or more). This kind is characterized by its broken-down, smooth texture and slightly sharp flavor. In some blends it is substituted for short held as a base.

In addition to age and texture, another important factor is acidity. Fairly acid cheese crumbles easily, hence its use is limited. Slightly acid cheese, however, is desirable in a blend for flavor.

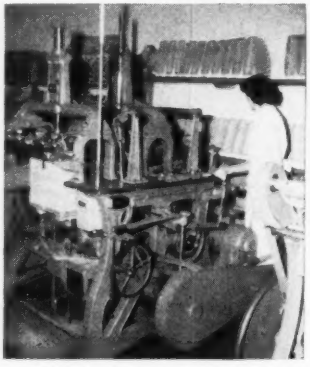
From the above partial delineation of types and factors to consider in blending, it is easy to understand why we maintain such a quantity of various-age cheddars in our underground storage caves. This stock is selected well in advance of planned use from an inventory list kept in Minneapolis. In addition, short held and current cheeses come to the plant directly from supply factories.

Bulk cheeses are delivered to our Minneapolis plant in 75-lb. wooden hoops and 40-lb. rindless blocks. Also, a very few midgets, or daisies, are received. After plugging a sample from a vat lot—about 20 hoops—and grading it for body, texture, and taste, the cheese is marked and travels on a belt conveyor into a 40-deg.-F. master cooler where it may further

. . . to final mixing



8 **MELTING** and mixing takes place in these jacketed stainless steel units. Emulsifiers, salt, and coloring are added here.

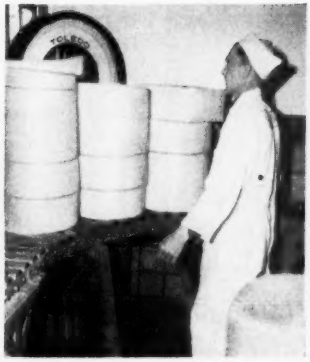


9 **CONTAINERS** for the 2- and 5-lb. packages are assembled (50 per min.) by automatic machinery. This unit puts bottoms on cartons.

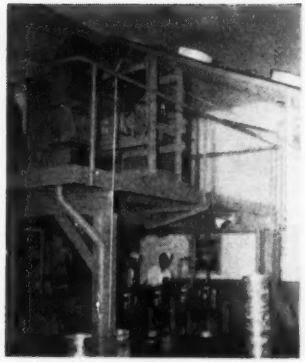
10 **PLIOFILM POUCHES** are fitted in containers as they are conveyed to filler valve of weight-by-volume unit.

blending and grinding . . .

5 FIRST STEP in cleaning is stripping off cheese cloth on this roller. All foreign matter is then removed by scraping.



6 EXACT BATCH of 475-lb. is weighed on this platform scale-mounted conveyor section. Blend is checked against guide chart for proper proportions.



7 GRINDING is by 100-hp. comminuter, where cheeses arrive on conveyor (top) from weighing room. Particles drop down into cooker.

age from 6 weeks to 3 months before use.

Blending Requires Skill

Blending cheese for processing is both an art and a science. Quantitative tests for moisture, fat and acid, offer values for semi-formulative use. But it is the skill and experience of the blender—his taste perception and knowledge of cheese types and their reaction in a mixture—that produce a consistently uniform product of desired flavor.

Many people have attempted a mathematical formulation of processed cheese without the services of a specially trained blender. And their results have invariably displayed this fact in detectable differences from day to day.

A most important part of our blender's job is to know the inventory in both plant and cave storage. He thus can plan his selection of cheeses well ahead of processing time and be sure that proper components of a blend are always on hand.

All tests on incoming cheese are made by the blender, who notes vat qualities, such as rubber, broken down or sharp, on a card in his inventory file.

When he requires certain cheeses for a day's run, he lists them on a chart, which then is used by the "wheelers"—hand truck operators—in collecting from the master cooler. Before actual blending, however, the selected cheeses go into an automatically controlled 70-deg.-F. tempering room for 72 hr. to stabilize their moisture content and make them easy to control in subsequent cooking.

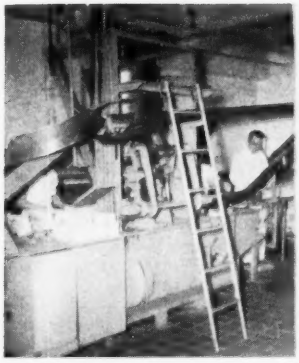
Moisture is an important consideration since the F&DA exactly limits it to 40 percent of content.

The tempered cheeses are again evaluated by the blender before they are released to the processing department in calculated proportions and quantities for a day's run. Cheese is then wheeled to the feed-in area, where proportioned quantities are piled for batch weigh-up.

Three basic varieties of processed

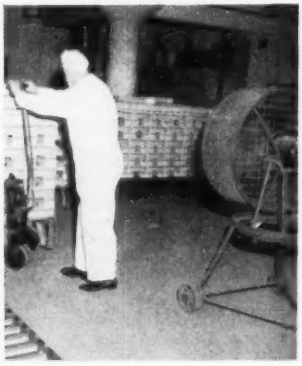
(Turn to page 131)

and packaging



11 FILLING is by a Nelson unit—with hot, melted cheese gravity-fed from cookers on floor above. Pouch is tucked and container closed.

12 FINISHED CONTAINERS are loosely palletized to permit free circulation of air to remove heat from melted product.



13 PALLET LOADS are removed to cooling area, where large fans create high-velocity movement of air. Here, storage is for 24-hr.

FAST ACTION: Incoming raw↓ **and outgoing finished↓**

BAGS OF SUGAR come to plant by rail. They're speedily shifted from car by lift truck in one-ton pallet loads.

CASES OF JAMS and jellies leave plant via truck-trailer. Lift trucks deliver loads right inside the carriers.

Lift Trucks *Multiply* Capacity

"Without a Foot Being Added to the Plant"

Ohio processor's modern handling not only expands storage in existing structures but also speeds work, simplifies inventory. It's safer, too

WILLARD E. SMUCKER
President, J. M. Smucker Co., Orrville, Ohio

Through adoption of unit-load handling operations carried out by five lift trucks, our organization—the J. M. Smucker Co.—has increased storage at its Orrville, Ohio, plant by several times what it used to be—and thus enabled us to meet a tripled demand for our products.

And we got all this extra capacity without a foot being added to the plant.

■ **The modernized system has not only upped warehousing space but at the same time has made the work easier and safer for our employees, zoomed speed of operations many fold, and simplified inventory control even though stock has greatly increased.**

All of these factors have augmented operating efficiency. The story of the striking advance is as follows:

The company processes fresh fruits into jams and jellies. At two West Coast plants (Wenatchee, Wash., and Oregon City, Ore.) fruits are washed, graded, and frozen, then shipped in refrigerated cars to Smucker plants in Salem and Orrville, Ohio. These Ohio plants also process fruits grown in the East and Midwest.

When the company began expanding to care for its rapidly growing business, there was a particular need for mass handling of raw materials and finished products, including the loading of truck fleets supplying the markets.

All of the handling of materials had been manual, with the use of small hand trucks. The materials, both drums and cases of goods, had to be moved from the raw stage to storage, to production, to finished goods warehouse, and onto the carriers by hand. Formerly, these goods had only been piled the equivalent in height of one loaded pallet.

The special problem was to meet the new demand for products by getting more output—which required new storage capacity with most economical and efficient utilization through the use of up-to-date material handling technics.

Lift trucks and palletizing of all loads proved to be the answer.

Today at Orrville, the company uses the new handling equipment in its raw materials receiving and storage warehouse, finished goods warehouse, and on the shipping platform. There are four 4,000-lb. lift trucks and one of 5,000-lb. capacity.*

Upper Space Utilized

There was no drastic revision in plant layout. As stated, the storage space above the first pallet had not been used—and therein lay the extra capacity. By employing lift trucks, the company was able to raise the heights to a maximum of five pallets, effecting the big increase in storage capacity above the floor.

One of the many materials-handling operations wherein labor-saving and time-saving have been effected is the unloading of box cars of sugar. A carload consists of 100,000 lb. (1,000 100-lb. bags).

* Four LT-44's and one LT-50, made by Towmotor Corp., Cleveland.

One lift truck with four men loading pallets in the box car can unload this car in 1 hr. 45 min. The truck picks up the sugar (2 tons at a time), carries it 200 ft. to the warehouse) and stores it in 30 sec.

Decided Difference

One may compare this fast performance with the time it would take those same five men to do this job manually—haul out the bags, carry them 200 ft., and muscle them up into stacks five pallets high (25 ft.)

Products and materials used by Smucker's are delivered by both rail and truck. All five lift trucks are utilized to unload the carriers. They are operated 8 hr. a day on the various handling operations, for a total of 40 truck-hours per day.

Trucks enter all carriers that bring materials to, or ship products from, the plant. Most loads are transported at least 200 ft.

The quick (1¾ hr.) unloading of a carrier, by using the trucks, not only effects a direct labor saving but also minimizes the time element, thus freeing the men to work on other jobs.

With the use of the trucks, the inventories of glass, fresh fruits, sugar, etc., can be kept very accurately. Each product has its own space in the warehouse, and each pallet has so many units on it. In counting inventory, therefore, the men need go only to one spot for each product or material and can quickly count the units involved.

When the materials are received they are placed in storage while awaiting transport to production. By using lift trucks in place of the former manual handling, Smucker's is able to utilize all parts of the plant because of the ease of transporting large unit loads.

From the warehouses, which are used for both raw materials and finished, the goods go by lift truck to either the production department or the shipping platform.

The cooking department is located on the second floor. Originally, the raw materials such as fruit, sugar, and juices, were tediously transferred to the second floor by elevator.

Just One Big "Step"

The fact that the cooking department uses hundreds of pounds of sugar a day, plus many gallons of fruits and juices, meant that a man with a hand truck would spend his time carrying a 100-lb. bag of sugar or two cans of fruit or juice (approx. 60 lb.) via elevator to the cooking department.

Today, Smucker's mass handles its sugar, juices, and fruits to the cooking department by an unusual method.

In the storage warehouse there is an outside wall facing the cooking department. The company cut an ample hole in the wall leading into the cooking department (see photo).

This doorway is about 10 ft. above the warehouse floor. The lift truck now raises two pallets of sugar (4,000 lb.), or one pallet of 60 cases of pineapple (3,000 lb.), directly into this open doorway, setting the load on the kitchen floor, ready for the cooks. One big step—but easy for the lift truck!

In the production department, the goods are packed in cases, each weighing 50 lb. As the packer finishes, he places the case on a waiting pallet. And when the pallet is loaded with 60 cases (3,000 lb.), a lift truck comes in and moves this unit-load to the finished goods warehouse for storage.

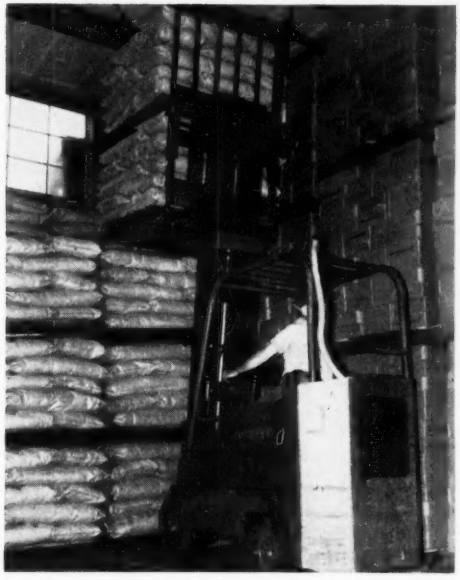
The distance involved is 300 ft., but only a little over 2 min. is needed to complete the operation. Formerly, this was all done by hand and hand truck.

Delays Eliminated

From production, finished goods are now moved to both storage and shipping. Use of the trucks has speeded the production flow by eliminating

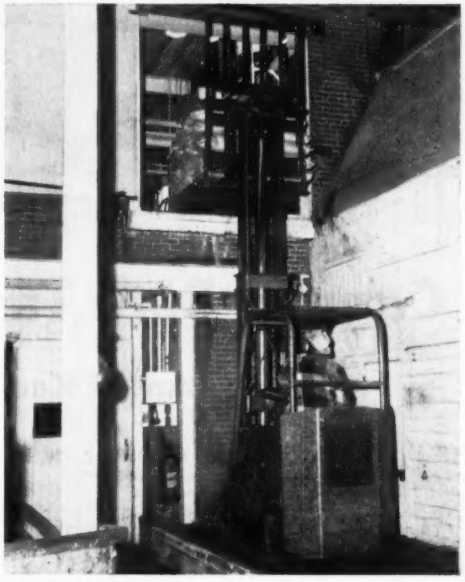
(*Turn to page 136*)

30 sec. to storage . . .

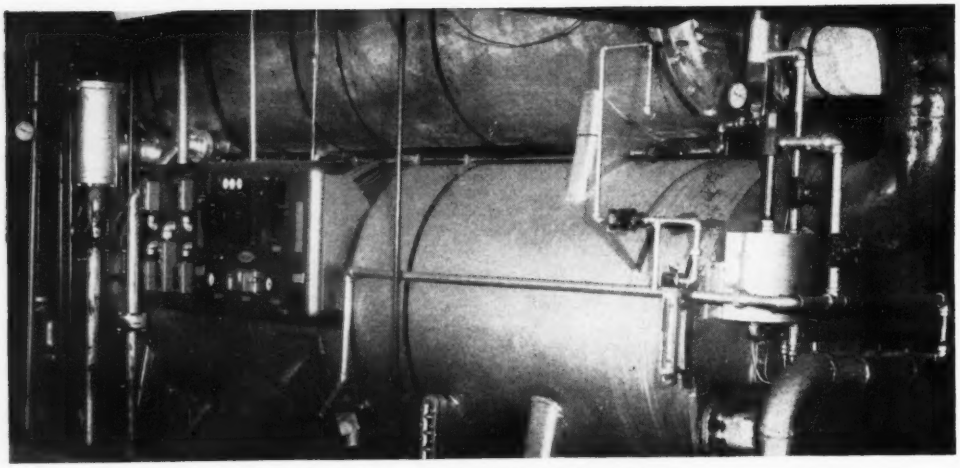


DIRECT from cars, pallets of sugar are sped to storage and stacked to the ceiling five pallets high.

. . . 30 sec. to processing



THEN THEY'RE whisked to processing in one easy step via this special door leading into cooking department.



Applying advanced absorption refrigeration . . .

. . . Hampden rapidly cools its product after pasteurizing. Result—

Canned Beer Tastes Like *Draught*

And It Keeps Longer, Too

H. M. BRODERICK and P. D. BISSELL
General Superintendent and Assistant General Superintendent, respectively, Hampden Brewing Co., Willimansett, Mass.

Quick cooling of beer immediately after pasteurizing brings these big benefits—

- **Greatly increased shelf life of the brew, and**
- **Reduction in the so-called "pasteurized taste"—to such an extent that bottled product now tastes like draught beer.**

Following extensive laboratory work on the problem of improving the quality of bottled beer, our company, Hampden Brewing Co., Willimansett, Mass., found that rapid cooling to between 55 and 60 deg. F. after pasteurizing would do the trick.

But translation of the laboratory findings into practical engineering terms—to give the simplest and most effective method of obtaining the necessary quick-cooling —required a unique change in our processing.

Water available for the extra cooling was too warm, especially in the summer when demand was highest. Also, the present pasteurizers did not provide sufficient cooling area to do the job.

To overcome the latter, Barry-Wehmiller Machinery Co. built a new regenerative Vortex spray pasteurizer, and rebuilt an existing one to our specification.

These new units contain a final cooling compartment isolated from the remainder of the pasteurizers. Even so, because of the low thermal conductivity of the glass bottles, process water at 40 deg. F., or lower, was required to effect the desired temperature drop in the beer, and we did not have adequate refrigeration to cool the water to this temperature.

Along with our engineering consultant, Fred Ophuls & Associates of New York City, we then evaluated available refrigerating equipment, finally choosing an absorption machine developed and manufactured by Carrier Corp. The following features of the unit formed the basis of our selection:

1. It could be used with low pressure, exhaust steam (12 psig).

A source of steam at this pressure (back-pressured from a turbine driving other plant equipment) was already available at little cost. Addition of the absorption machine permitted more continuous operation of the turbine without steam wastage, thus bringing an improvement in the plant's heat balance.

2. Steam consumption per ton of refrigeration remained almost the same over the entire load range.
3. The machine did not require a licensed operator.
4. It did not use hazardous refrigerants.

How System Works

In the new procedure, process water at 40 deg. F. is sprayed continuously over cans or bottles at the rate of 600 gpm. This water is then recirculated through a water-to-water heat exchanger, where it in turn is cooled by chilled 37-deg. F. water from the absorption machine (see Fig. 1). Such a heat exchanger is necessary to provide a closed circuit for the chilled water from the absorption machine, which operates under a vacuum.

The absorption machine (Fig. 2) uses *only* water as a refrigerant and, unlike the usual refrigerating devices, has no moving parts other than solution and water pumps. It operates on the principle that the sensible heat in water can be converted to latent heat and removed—by evaporating a portion of the water and absorbing the vapor in a salt solution.

Water returning from the external heat exchanger is sprayed into the absorber shell. Since this shell is maintained at a low absolute pressure, some of the water flashes, cooling the remainder to a temperature corresponding approximately to this pressure. The chilled water is collected in an evaporator tank beneath the sprays and from here is pumped back to the external heat exchanger.

The water vapor passes around the evaporator tank to the lower portion of the absorber shell. In this part of the shell, concentrated lithium salt solution is sprayed over tubes through which condenser water is circulated. The salt solution absorbs the vapor, and the heat (released as the vapor again becomes a liquid) is removed by the condenser water.

The salt solution, weakened by absorption of water vapor, is pumped continuously to a generator shell. Here, steam passing through generator tubes boils off the water, bringing the solution back to full strength. The water vapor is condensed in the upper part of the generator shell and collected in a condenser tank. It is then piped back to the evaporator tank so that no water is lost in the cycle.

(Turn to page 134)

FIG. 1 - BOTTLE COOLING SETUP

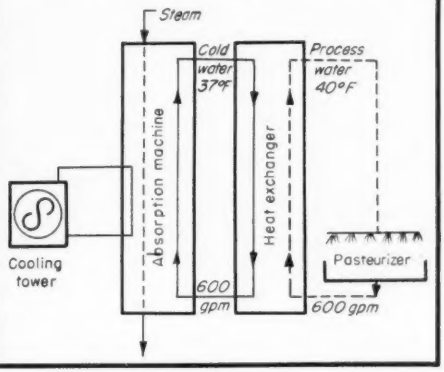
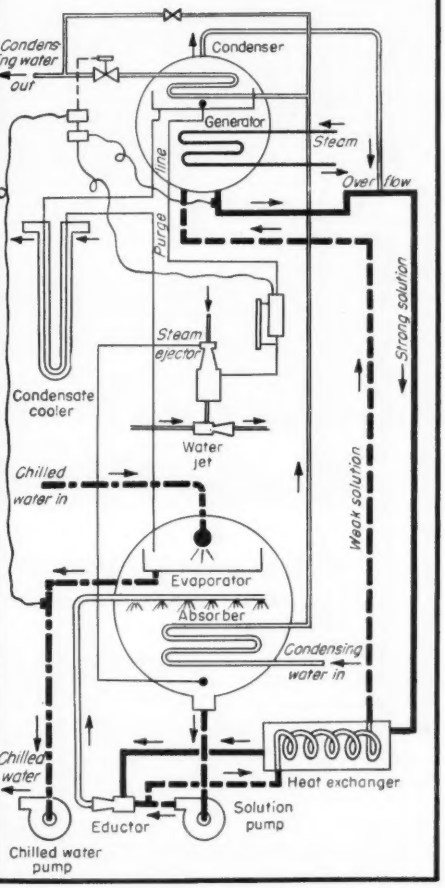
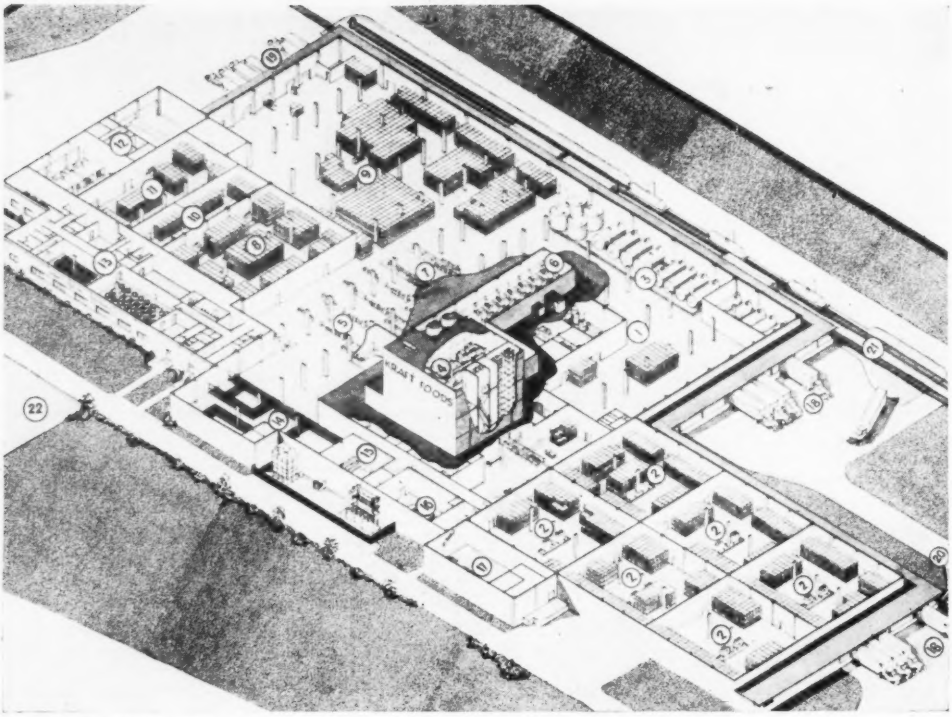


FIG. 2 - ABSORPTION MACHINE DETAILS





FUNCTIONAL layout of plant, as shown by architect's sketch, reveals a highly efficient arrangement and indicates placement of equipment and facilities. Legend: (1) Receiving area, (2) Raw products cold storage, (3) Salad dressing-margarine oil tanks, (4) Process cheese preparation, and (5) Packaging, (6) Salad dressing preparation, and (7) Packaging, (8) Finished goods cold storage, and (9) dry storage, (10) Atlanta sales cold storage, and (11) dry storage, and (12) Trucking, (13) Office-cafeteria area, (14) Maintenance shop, (15) Refrigeration equipment, (16) Boiler room, (17) Incinerator room, (18) Raw materials trucking (incoming), (19) Finished goods trucking (outgoing, (20) Incoming RR spur for cold storage raw materials, (21) Outgoing and incoming spur for manufacturing supplies and finished products, and (22) Parking area. The plant was built by the Corbetta Construction Co.

Remarkable Venture in Planning and Construction . . .

Kraft's New Southeast Plant

Built around a pallet, this factory is engineered for quick, easy materials flow. And advanced structural design saves tremendous quantities of steel

HARRY G. PODLESAK
Vice-President and Executive Engineer,
Kraft Foods Co., Chicago

When the chips are down, two basic commodities—manpower and steel—become critical pacemakers in a nation's industrial mobilization.

These two prime factors were very much in the minds of Kraft Foods Co. planners when it was decided to centralize and increase Southeast production to keep pace with dynamic industrial growth. And resulting is a new plant at Decatur, Ga.—just put "on-stream" late this spring—which is remarkably in tune with the times through its . . .

▶ **Savings in Steel—This is the first food manufacturing building on this continent constructed of pre-cast, thin-shell concrete, providing tremendous economy in structural-frame, wall, and floor-section steel.**

▶ **Conservation of Man-Hours—It's layout, evolved from a single, efficient pallet size, practically eliminates unnecessary and fatiguing manual operations through maximum use of modern materials handling equipment and straight-line flow from receiving to shipping.**

Before detailing construction and

layout features of the new facility, a few words about its inception:

Both agricultural and industrial growth in the vigorous Southeast made the company realize—back in 1950—that its Atlanta operation was well on its way to being outmoded. For example, the area's rising cow population alone flooded us with over 200 million pounds of milk that year. And expanding sales among an increasingly prosperous 23 million people made it necessary that we consider processing in even greater quantity.

It was decided that a new, central plant would be built that could turn out in an 8-hr. day over 50,000 units—the complete line of cheese, cheese products, salad dressings, and margarine. Then, as sales required, this output could be upped to a total of over 150,000 units in a full 24-hr. work period.

In line with these facilities, sufficient refrigerated storage space was needed to hold 10 million pounds of palletized cheese, together with additional areas, both refrigerated and dry, for storing supplies and finished goods prior to distribution to 15 sales branches within the division. And other separate room areas had to be planned for preparing and storing condiments, involving such ingredients as eggs, starch, spices, mustard, and relish.

Planning Detailed

Fortunately, experience gained in completing the world's largest cheese processing plant in Chicago made an excellent starting point for planning the Decatur unit.

First, a senior project engineer was set up to coordinate the planning, which drew on the talent of various company departments. As each phase of the project came up, these specialists—including production men, and mechanical, sanitary, and materials-handling engineers—made sure that the latest thinking in their respective fields was carried out.

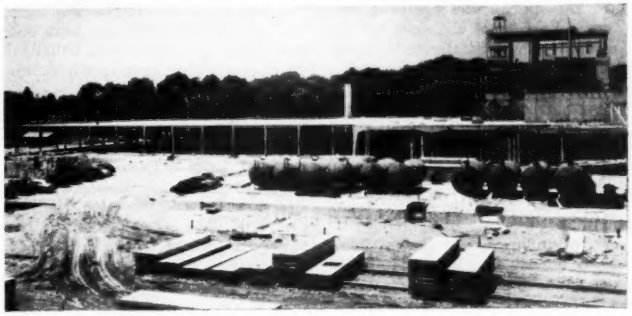
In typical consultation with the senior project engineer, members of this group analyzed every move of material (raw and finished), supplies, and manpower within the proposed plant, employee fatigue in operations and means to combat it, and the tonnage in liquids and solids to be handled in low and peak seasons through processing operations.

Just about the first thing decided was the most economical type and size of pallet to be used—as determined from experiments and tests by materials handling experts. From this simple pallet size, the exact bay dimensions for roof-column spacing was arrived at, and layout of the floor plan

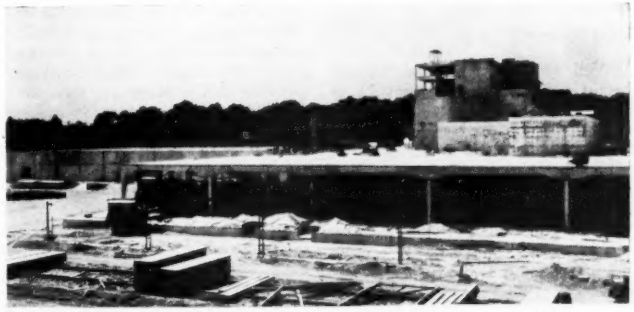
UP SHE GOES—From Forms to Factory

PRECAST concrete sections are made in forms at plant-construction site.

THIN CONCRETE slabs are stacked as concrete frame rises alongside.



SLABS COVER frame, and superstructure rises. Tanks go in on open floor.



SIDE SLABS enclose a wing as structure is extended to cover tanks.

began to take shape. Other tests on appropriate motor equipment, water, and local temperature also preceded drafting of the preliminary drawings, which were released in mid-1950.

About this time, a 25-acre site for the plant was purchased at Decatur, and plans were launched to provide it with new highway and railroad facilities. To ready the location, over 168,000 cu. yd. of dirt had to be removed and 14,000 tons of granite and sand fill brought in.

Unusual Construction

Due to the Korean outbreak and subsequent government restrictions on building steel, our engineers made a study of unconventional building methods that would ease the use of this critical material.

Particularly interesting was the pre-cast thin-shell concrete system originated in this country by the internationally recognized designer, Arsham Amirikian. This principle was accepted, and Amirikian was retained to design and engineer the building shell. To meet existing building codes, all items such as columns, center girders, struts, roof beams, and roof slabs were designed and engineered to employ 5,000-lb. test concrete and reinforcing steel to exceed safety and load factors.

Casting beds for the thin-walled concrete units were built of hand-finished, smooth concrete directly on the ground. Each mold was made to cast one of the standard structural forms used in the building. And then each form was cored and connected to a flat surface on the casting so that compressed air could be introduced to pry it from the mold after sufficient curing time had elapsed.

Forms, before use, were carefully cleaned and oiled, then pre-formed reinforcing steel was inserted and correctly positioned. The concrete was poured and vibrated into place to remove all voids. Its top surface was then trowel-finished. And 24 hr. of curing took place before the casting was removed from the bed.

Long Sections Cast

Wall slabs were pre-cast at full height (22-24 ft.) in sections 21 ft. long. Wall sections consisted of 2 in. of concrete on both sides of 2-in. Foamglas. In cooler walls, however, width of this sandwich type insulation was increased to 4 in. of Foamglas. A total of 44 carloads of the insulation was used in the entire building.

Since all forms were pre-cast, casting beds were also set up for beams, girders, column, and roof panels. The latter units were 5 ft. 3 in. wide and 21 ft. long. The entire roof section consisted of pre-cast concrete channel slabs, topped by a 4-in. layer of Foamglas, with a built-up roof above this of felt, pitch, and gravel.

Three casting beds were built—the roof slab bed (250x24ft.), the exterior wall bed (200x25 ft.), and the column and T-head bed (75x30 ft.). The total of pre-cast pieces from these beds was as follows:

Columns	415
Column heads	344
Center girders	227
Struts	130
Roof beams	60
Roof panels	1,950
Wall panels	120
Total	3,246

The wall slabs were pre-cast in groups of five and transferred directly from casting bed to building position. No pre-curing time before installation was necessary on these items since they carried no stress load.

Because of the size of the wall slabs, a special converted bomber crane with 65-ft. boom was needed to move these from casting beds to final location.

Moving Castings From Beds

Extricating a casting from its bed was accomplished by introducing compressed air between casting and form. At the same time, a vacuum pad, made to fit on top of the casting—was laid over by the crane and attached by vacuum. A gasket between form and pad allowed this vacuum to be pulled by a pump running constantly during the lifting operation.

After being freed, the casting was laid on the curing pile and released from the vacuum. Curing for a minimum of seven days followed before final assembling and placement in the structure. In actual erection, the pre-cast wall slabs were welded to the structural pre-cast frame by utilizing steel inserts (also pre-cast) in both members.

In this manner a total of 11,750 cu. yd. of concrete and 760 tons of reinforcing steel was used in constructing the building shell. In addition, 56,000 concrete blocks were employed for inside partitions. And 211,320 pieces of glazed tile, plus 92,400 brick pavers, were also laid in processing areas.

It's a major tribute to the striking speed of this new construction technique, and to the closely coordinated teamwork of those working on the project, that only 26 months after the date of conception the new plant started commercial production, in spite of such hurdles as engineering design problems and scarcity of materials.

In engineering plans to be used in the pre-cast method, a great deal of thought went into the location of drain and vent openings. Also, an insert pattern was pre-determined in all slabs so that each piping trade was alloted certain inserts from which to service equipment with electrical, water, and refrigeration lines.

A similar insert pattern was followed in the four-story, poured-in-place concrete processing tower at the center of the plant. Such a construction technique was necessary because of the special bay dimensions needed to contain processing equipment and extra floor-loading features required.

Incorporated in the plant is what is believed to be the most extensive underground system of piping yet placed in a food processing facility. All sewerage, drainage, main water, and electrical lines are below ground. The entire system was installed, tested, then covered for protection before any concrete flooring was poured.

Underground electrical service consists of a six-conductor, double-circuited cable, fused on both ends, with both circuits carrying an approximate load of 4,000 kva. Each circuit is equipped with interrupter switches to change from line to line; or, in emergencies, to parallel both lines—without interrupting service in the plant.

While this flexible system is a major innovation in the Southern area, it actually is a less expensive and simpler method of handling plant power, since it does away with the need for circuit breakers.

A central electrical switchboard is set over a cable pit which receives all major circuits in the plant. Power distribution from this point to all parts of the plant—with the exception of the processing area—is under the floor to buss ducts.

Part of the underground piping includes a special drainage system that permits a reclaiming of fat accumulations in wash-up water. Because of this a minimum of foreign substance gets into the main sewerage system and much less load is placed on community facilities.

Advanced Materials Handling

Functionally, the new structure—offering 269,000 sq. ft. of floor space in a 300 by 700 ft. area—is set up to take advantage of all phases of automatic materials handling and provide an uninterrupted flow of incoming ingredients, through processing to finished-product shipment.

The new plant affords a one-story operation, except for the main processing area, which is a four-story central tower. This arrangement trims the handling of goods to a minimum and does much to speed product efficiently

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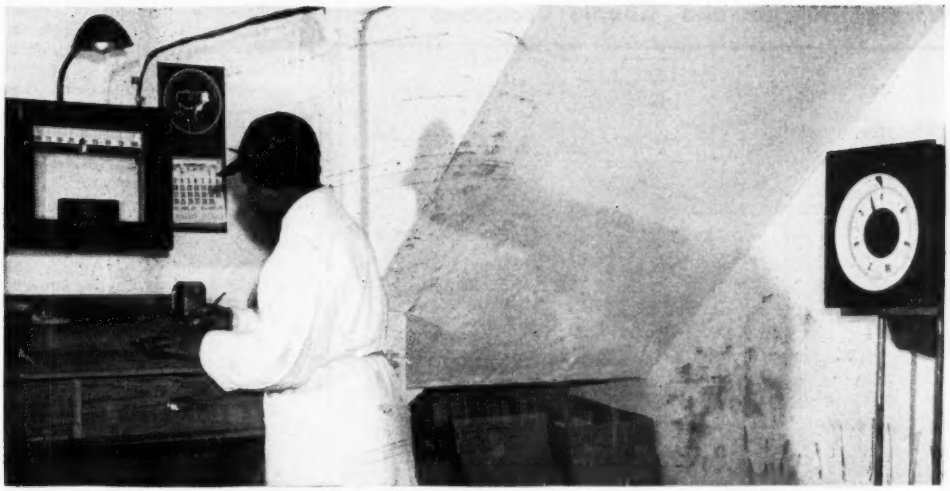


RECORDER (left) charts temperature of six cold-room locations, signals unsafe change. Control instrument (right) indicates sub-floor temperature, turns on radiant heating system before freezing condition is reached.

Removes Freezing Hazard Below Sub-Zero Rooms

Radiant heat, controlled electronically, goes automatically into area beneath floors whenever there's threat of a freeze. Thus plant is safeguarded against expansion which would heavily strain—and can even undermine—the structure

G. F. WERLIN and V. L. EVANS

Respectively, Plant Superintendent, Cross Brothers Meat Packing Co., Philadelphia, and Representative, Minneapolis-Honeywell Regulator Co., Philadelphia

In order to operate its ground-level meat storage rooms at sub-zero temperatures without risk of impairing the flooring or building foundation through expansion due to freezing, Cross Brothers Meat Packing Co., Philadelphia, has installed a special system of electric heating cables featuring automatic safety control.

Put in during the early stages of the new plant's construction, the system is designed to provide extra protection by indicating when the sub-floor temperature drops to an unsafe level, in which case electric heat is automatically applied to correct the condition.

First, a brief review of the problem: When a freezing room is to be built at ground level, or when a ground-level cooler is to be converted for low temperature storage, it is essential that the floor insulation be adequate to prevent too rapid temperature leakage to the area beneath.

A concrete sub-floor, covered by ample insulation and with a concrete wearing-floor on top, is the recommended construction. Mechanical strength is thus provided, along with moisture vapor-proof insulation, and ample protection for this insulation.

However, even when this approved construction is used and there is adequate thickness of insulation, some heat may still be absorbed from the ground near the cold room foundations.

In case the rate of leakage from the low-temperature room to the ground and foundation is higher than the rate at which heat is gained from the surrounding earth, there will be a gradual temperature decrease beneath the floor of the sub-zero room, until the freezing point is reached. Then the frozen moisture in the soil expands, exerting a tremendous pressure on floor and foundation.

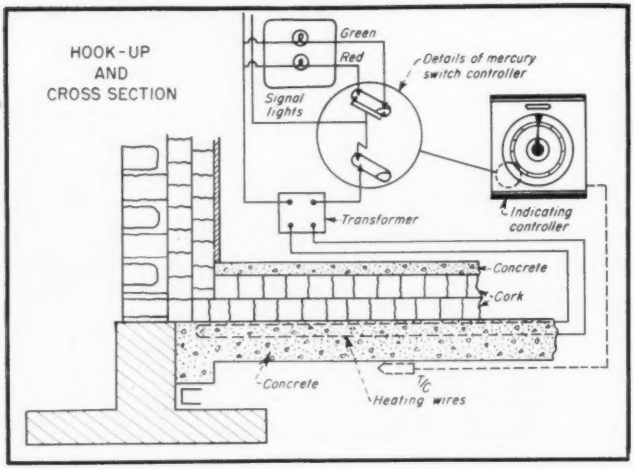
Cracked and buckled floors are the usual result. In extreme cases, entire buildings have collapsed under the strain of pressure due to freezing beneath a sub-zero storage room floor.

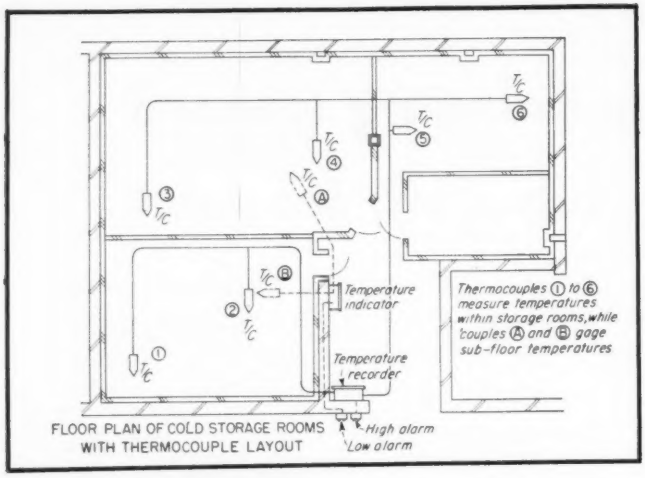
Meeting the Problem

Here are details of the moves made to prevent such a catastrophe at Cross Brothers' wholesale beef plant.

Among the systems for preventing

Wiring Diagram and 'Couple Locations





FLOOR PLAN OF COLD STORAGE ROOMS WITH THERMOCOUPLE LAYOUT

INSULATED DOOR, shown open, is closed and locked at night. Visible to watchman in corridor is red light (arrow) which warns of heat rise in cold rooms.

below-floor frosting that were submitted by Armstrong Cork Co. engineers was one installed in England, which had been hailed as very favorable. Electric radiant heating cables were extended under the floor in this installation, with control provided by a temperature regulating instrument whose bulbs also were located under the floor.

With minor deviations, the meat company's installation was patterned after this English system. However, instead of using a thermometer-type control, an electronic-type potentiometer (ElectroniK, Brown) was chosen. Preference was given this method of control because it did not require long, easily breakable capillary tubes. Also, no special insulation was needed.

Another reason was the fact that it would not be necessary to run special electric lines for periodic heating of the thermometer bulb in order to check on its response to temperature changes. Furthermore, potentiometer control has the advantage that a burn-out of the thermo-cable circuit can easily be checked by a pyrometer.

Installation Details

To make one of the most critical determinations on which to base the layout of the system—the proper location for two thermocouple control elements—the sub-floor temperature distribution was carefully plotted. Account was taken of the temperature to be maintained in each of the cold-rooms.

Then, the conduction of heat through the vertical support columns was calculated and also the minimum heat that would be supplied from the ground surrounding that under the storage rooms.

After these determinations, each thermocouple was located in the coldest spot in its area. As in the case of the radiant heating wires, thermocouples were installed just above the coarse aggregate that covers the subsoil on which the refrigerated rooms are built.

Though the new cold rooms have been in use for more than 10 months at our average temperature of −15 deg. F., the sub-floor temperature is still in the neighborhood of 40 deg. F. due to the heat absorbed from the surrounding soil.

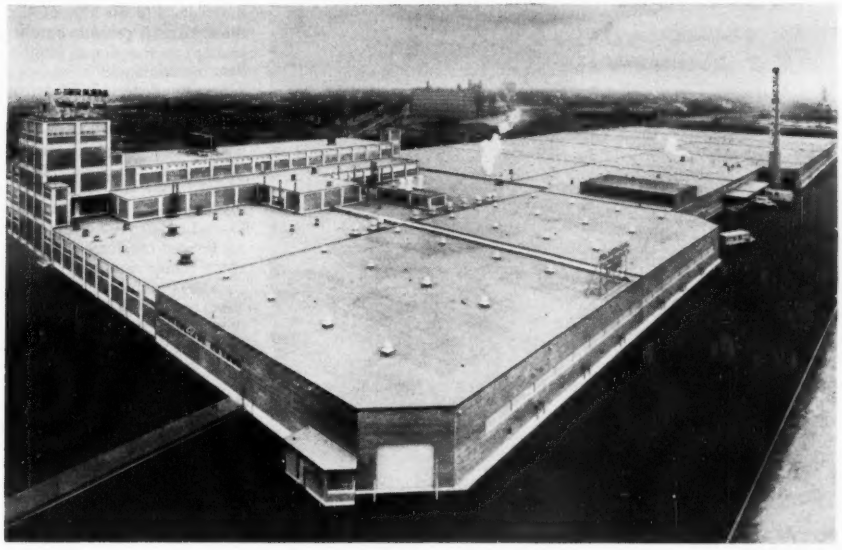
However, the cold-room temperatures are soon to be lowered to −20 deg. F. Then if the sub-floor temperature drops to 35 deg. F., the electronic potentiometer, which constantly records the below-floor temperature, will turn on the power to the heating cables (through an auxiliary switch) and simultaneously operate the circuit of a sub-floor-temperature warning light.

One-Instrument Area Checks

Temperatures at six points in the cold-rooms are continuously charted on a multi-point potentiometer from variously located thermocouples. Periodically, a mark is made on the chart, accompanied by an identifying code number for each thermocouple. Together, these indicate time, temperature, and location of the readings. The time—day, hour—is checked on

(Turn to page 144)

A SPECIAL FOOD ENGINEERING REPORT



OVERALL view of plant reveals roofing area of 17 acres. Bakery (foreground) and three-story section at left provide 160,000 sq. ft. of floor space. One-story section in rear is 510,000-sq. ft. warehouse.

New Automatic Plant Gives Them—

Quantity and Quality *Plus*

Advanced materials handling systems, high-speed in-line production machines, and functional units providing constant product protection highlight this new facility . . . Structure and layout are outstanding

A. J. FAULHABER and M. EISENSTAEDT*

Respectively, Vice-President-Engineering, and Director of Bakery Operations, American Stores Co., Philadelphia

Notable achievements in advanced food plant engineering make the new multi-million dollar American Stores Co. plant in Philadelphia one of the nation's most efficiently operated and best electro-mechanically equipped facilities for processing quality foods.

Outstanding advances are incorporated in the materials handling of both solids and liquids. Included are features that constantly protect the products. From receipt of raw ingredients to shipment of finished goods, high-speed automatic machines and mass production operations bring savings, which are passed on to the consumer in the form of superior goods at minimum cost.

Increased business demanded expanded facilities. And at the same time rising costs of the company's former properties—three plants located in different sections of the city—called for modernization that would stress performance efficiency and economy.

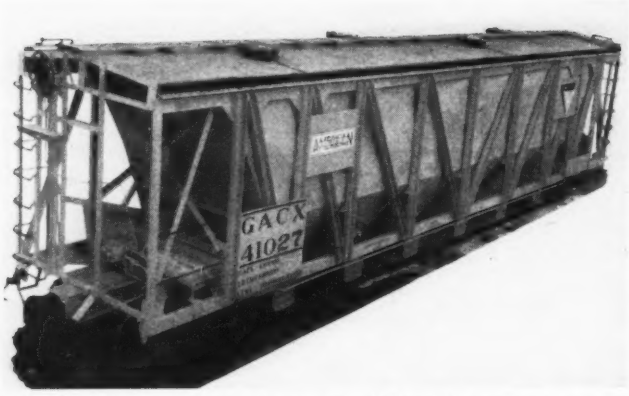
A thorough study of the entire problem then revealed that centralization in a new, modern plant designed and built to fit the needs was the logical solution.

* As told to editors of "Food Engineering"

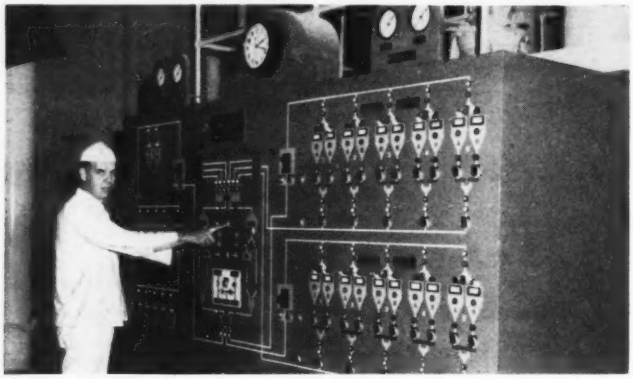
I—Structural Strides

The new facilities are located on a 34.6-acre tract of land in the western section of the city. The building proper consists of a one-story warehouse affording 510,750 sq. ft. of floor

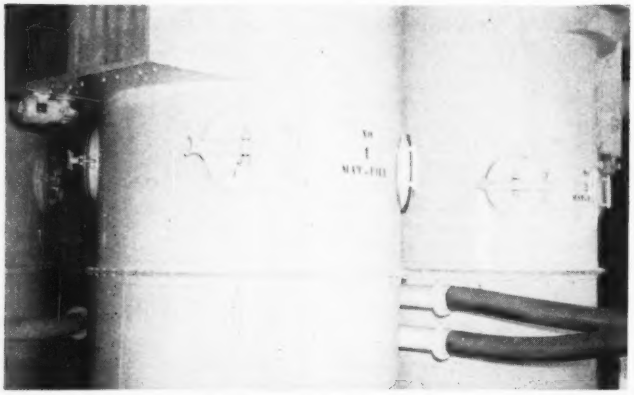
Dry-Bulk Carriers . . .



COVERED-TYPE hopper car was specifically designed for economic and sanitary bulk shipments of dry granular or powdered materials.



HEART of dry bulk materials handling is this control panel. Each conveying combination has a corresponding interlocked electrical circuit.



FLOUR from cars is removed from air stream in these material filters. Companion units catch remaining dust in system.

space and a three-story bakery having 260,000 sq. ft.

Roofing area of the new building totals 17 acres, or about 51 percent of the plot. For an idea of the size of the structural project, here is a quick resume of the major building materials incorporated:

Structural steel, 2,500 tons. . . Reinforcing steel, 950 tons. . . Total miscellaneous iron, 530 tons. . . Masonry, 6 million bricks. . . Electrical conduit, 43 mi. . . . Water and steam piping 41 mi.

The area is exceptionally well lighted. Mercury lamp luminaries are located on street-light poles on the truck ramp leading from the city streets. Outdoor signs on the water tower and chimneys are floodlighted at night, and prismatic flood lights are mounted on the walls for general outdoor lighting. All yard lighting is controlled by astronomical time switches that are automatically turned on at dusk, switched off at dawn.

To describe all the advanced engineering incorporated in both the bakery and warehouse in a single article would necessitate too much space. Hence, our present text will be limited to the bakery.

Built for Efficiency

This structure is an excellent example of modern fire-proof, highly sanitary, low maintenance construction. Its initial cost might be considered relatively high, but its annual operating costs, including insurance, repairs, and cleaning, are at a minimum. In short, it portrays management's farsightedness in targeting economical yet cleanly operation, particularly vital in a food plant.

The building has a reinforced concrete frame, mushroom type columns, reinforced concrete floor slabs, precast Kaylo roof planks, and a 20-year bonded built-up roof. Curtain walls are brick. Fenestration consists of sash and glass block. Copper flashing is used throughout. Lintels and copings are precast concrete. So much for the exterior—which can be summed up by saying that all materials used are those requiring only a minimum of maintenance, if any.

Now for the interior—and here again functional quality was No. 1 in the selection of building materials. Walls are glazed tile from the floor cove to the ceiling. Special wall construction features parts of the bakery. In those sections subject to industrial traffic—power-, hand-trucks, or other movable equipment—a 14-gage galvanized-metal protective sheet is incorporated in the wall base to a height of approximately 2 ft. This base section projects slightly from the wall

proper. The same protection is given to the columns. On these, the sheet metal rises to a height of 5 ft.

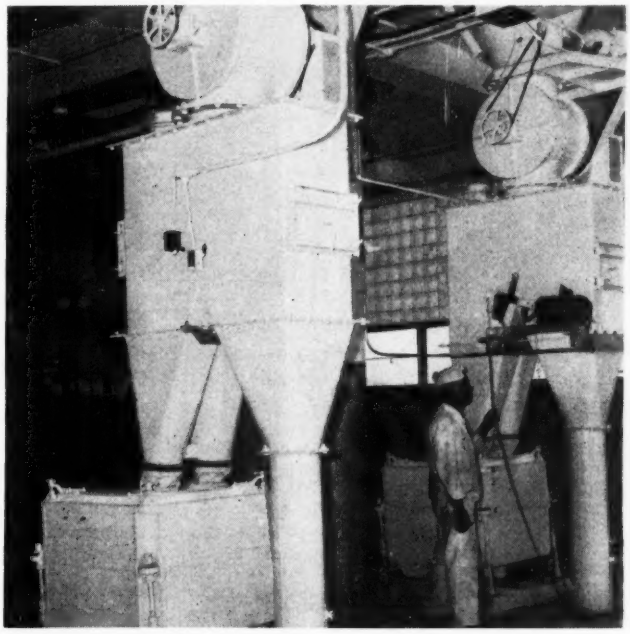
In this manner, possible bumping or scratching—which would result in spawling of the concrete and give unsightly, uneven, or rough wall surfaces—are eliminated. These details may appear to be small items but they all add up to simpler and less costly maintenance and better sanitation, too.

Flooring materials were selected precisely in line with the service to which they are subjected. In the hallways, and office areas, asphalt tile is used. These tile, kept waxed and polished, present a very attractive appearance and reflect an atmosphere of cleanliness—desirable in any food plant.

In the manufacturing area, a resin tile is employed. Here, cleaning operations are continuous. A Lincoln wet-vacuum cleaner, electrically driven, is kept in constant operation in this area to maintain sanitation at peak.

Drehmann tile is used in the mixing area and other locations where equipment is washed down daily. These floors are sloped for fast and thorough water runoff and are equipped with appropriate floor drains.

Another noteworthy construction feature is the cantilevered canopy over the receiving dock. The extended roof provides protected unloading operations regardless of the weather. This factor is extremely important at this plant, since incoming raws, both solids and liquids, are received in bulk cars.



THROUGH air locks (at ceiling) flour drops into hoppers feeding gyratory sifters. Bypass lines are in front.

II—Materials Handling

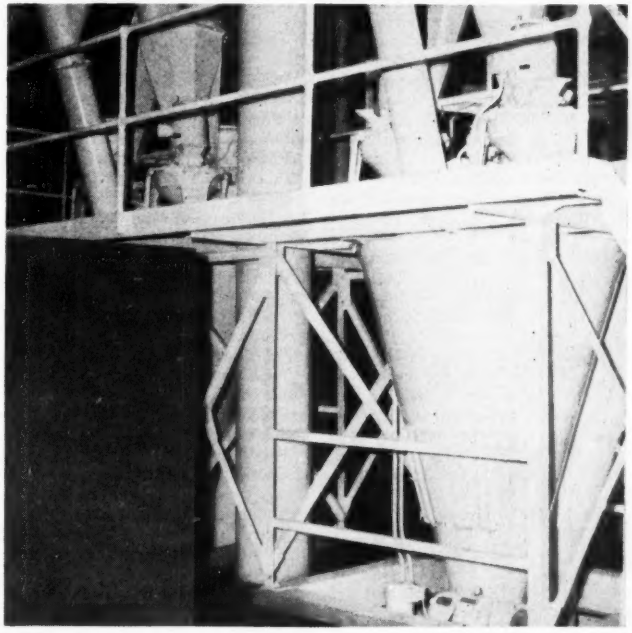
We now come to one of the most advanced operations in the plant: The handling of raw products.

Receiving the Drys

Flour is received by Trans-Flo, GATX car. This carrier, a covered-hopper type, was specifically designed for the economic and sanitary bulk transportation of dry, granular, or powdered commodities. It is composed of two large all-welded steel compartments supported by a rigid superstructure of side and end members. Capacity of the car is 3,150 cu. ft., equivalent to an average payload of 115,000 lb. It is 55 ft. 3½ in. long, 14 ft. high, and 10 ft. 6 in. wide.

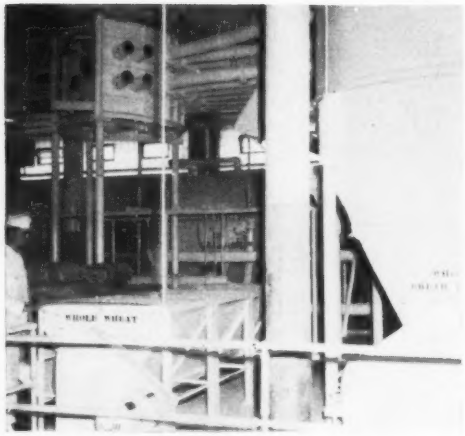
Each compartment has two circular loading hatches on top. Material is evacuated from the car by means of a pneumatic conveying system. Each compartment has three pairs of hopper bottoms, and each pair is joined at the bottom by an unloading assembly.

At the bakery dock, the pneumatic system is connected to the car by

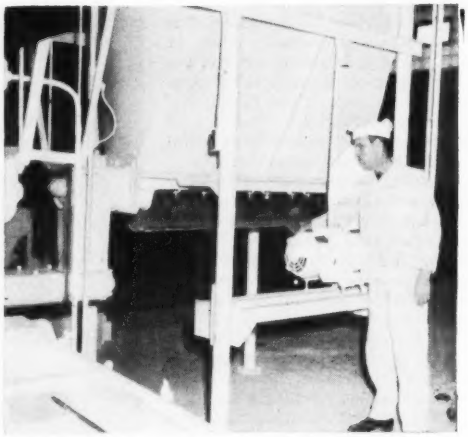


THREE-WAY distributors (top) feed flour evenly to batteries of Entoleters for third treatment prior to storage.

How Solids Travel To and From "Use" Bins



DISTRIBUTION of bulk solids from silos to use bins is controlled by motorized pipe switches (top left).



BOTTOM section of use bin is hinged. It's high enough off floor to permit operator to clean it quickly.

means of a flexible metal hose which attaches to one of six unloading-nozzle assemblies. In order to empty the car completely, connections must be made to all six, one at a time.

In the unloading operations, clean filters are placed in the hatches (there are four) at the top of the car. These hatches are then left open with the filters in place, otherwise a partial vacuum would be placed on each compartment during unloading and result in the collapsing of the compartments.

The filters that were removed from the car upon arrival are cleaned with compressed air, stored in a safe place, and are then ready for use when the next bulk car arrives. Thus, clean filters are always on hand.

Bulk storage facilities consist of 20 steel silos inside the plant. The steel has been given a two-coat lining of plastic material to give maximum smoothness and sanitation. Each silo, 90 ft. high, 8 ft. in dia., has a capacity of 120,000 lb. An interesting detail on the 8 ft. dia. dimension is the fact that bridging or arching of the flour is not encountered if the diameter is held at or below this figure.

The entire movement of dry bulk ingredients from the receiving dock to the use bins is via a Fuller Airveyor. This installation consists of two independent vacuum-pressure systems. It was designed to operate with a maximum of flexibility through its supply, material, and dust-pipe switches to unload bagged flour, sugar, Cerelose, or bulk flour from three car positions and deliver to two groups of ten storage silos. Flour is moved at the rate of 20 tons an hour, sugar from trucks at 10 tons an hour.

The system is operated from a single control board featuring interlocked pushbutton controls to minimize any possible errors. One operator does the job. He simply pushes a series of buttons to unload or distribute flour, sugar, or Cerelose. Lights on the panel board indicate the particular line of flow—incoming or distribution. In fact they will show both at the same time if desired.

To assure product quality in this plant, the materials handling layout provides four distinct treatments for flour before it reaches the mixer. Three of these are given prior to the flour entering the storage silos.

From the unloading assembly on the bulk car, flour is drawn by vacuum through an 8-in. dia. metal duct to the top of the third floor in the bakery. Here, it enters a dual-turret filter system designed for indoor service. The first unit—the material filter—removes the flour from the air stream. The second catches the remaining dust before the air reaches the prime mover, a Roots-Connersville type exhauster.

Each filter unit comprises a round tank of approximately 6 ft. 9 in. dia. and 12 ft. high. Construction is of stainless-clad metal.

Inside the material-filter are four compartments, one of which is out of service every 2 min. for automatically cleaning the cloth filter tubes. Motors attached to each compartment shake the tubes continuously for approximately 15 sec. Valves, which cut the compartments in and out of service for cleaning, are can-operated from a common shaft.

Flour collected in the material filter leaves via an air lock and drops to an all-metal, gyratory sifter (Allis-Chalmers). From this unit, it is fed through a three-way distributor that proportions the stream of flour evenly among a battery of three Entoleters—its third treatment prior to entering the storage bins. Collected into a hopper beneath these units, it is now fed into the air line on the positive side of the exhauster and blown up into the 90-ft. silos.

At the entrance on top of each huge silo, the air line leads into a cyclonette, to which is attached a return air line leading back to the exhauster via the dust filter—thus constituting a closed system.

10-Sec. Horn

Silos are equipped with high and low level bin indicators which function as safety devices. For example, when a storage bin becomes full, the material in the bin will cause the high level indicator to close its contacts, energizing the corresponding red light on the control panel. A warning horn will sound for approximately 10 sec. signalling that the bin is full. The system will run for approximately 10 sec. after the alarm has ceased, then will shut down automatically.

If the operation is reclaiming material from a storage bin, the screw feeder will stop and a butterfly valve will close when the alarm sounds. The system will clean out automatically, then shut down.

In the bakery proper there are 23 "use" bins on the third floor. Material from these units is fed to the various mixers on the floor below. These bins range in capacity from 10

to 200 bbl. They are itemized as follows: Various types of flour, 12; Sugar, 7; Dry milk solids, 2; Salt, 1; Cinnamon, 1.

How Solids Are Distributed

Movement of flour, sugar, and Cerelose from the silos to these "use" bins is via the air conveyor. Flow is completely controlled from the central panel. This distribution system is comprised of two 7-in. o.d. tubes—one a material line that goes to the "use" bin, the other the dust or return line bringing the air back to the dust filter.

Each bin is equipped with a "breather" and a dust outlet to which the return line is attached. Mounted on the top of the bin, the "breather" is counterweighted so that when material is being delivered to the bin, air is drawn in through this unit, thereby preventing any dust from escaping. This is accomplished by having the pressures between the delivery and vacuum line in favor of the latter. In operation, for every 1-lb. of pressure on the delivery end, a 2-lb. vacuum is maintained on the return line.

To transfer material from the silos to various "use" bins necessitates the employment of switches in the delivery lines. In this installation there are two 9-way, motor-operated pipe switches. The motors are energized from the control panel. When the system is delivering to a particular bin, the entire flow is clearly shown on the panel board by indicating lights. When the operator is setting up for delivery of material, the supply, material, and dust-pipe switches must all be in order to get the flow lights for the motor-operated pipe switches to indicate. In short, each conveying combination has a corresponding interlocked circuit.

The "use" bins are also equipped with "high" and "low" bin level indicators tied back to the panel for central operation.

Ingredients are drawn from these bins by control buttons on the floor below at the mixers. Flour then travels via spiral tube conveyor to a vibratory sifter—the fourth treatment given the flour in this plant prior to its employment in the finished product.

Sanitary features were also stressed in the installation and construction of the "use" bins. Outlets from these hoppers are all well above the floor permitting easy access to the trough conveyor. The bottom, semi-circular tube portion is a hinged section. Simply dropping this piece exposes its entire surface as well as the screw proper for thorough, fast, and easy cleaning.

Vegetable oils and lard are both handled in bulk at this plant. Facilities are provided for delivery by railroad tank cars and by tank trucks. Transfer of these products into the plant is via steam tracer-heated pipe lines, with a rotary positive displacement pump as the prime mover.

These materials are stored in four insulated tanks of 12,000-gal. capacity, set horizontal on the third floor. Two contain vegetable oil, and two are for lard. The tanks are equipped with steam-immersion heaters operating under electro-thermostatic controllers to hold uniform temperature of fats.

To assure product quality, a means of very efficient protection has been incorporated in the bulk-liquids handling installation. Stratification, rancidity and oxidation of these fats in storage is eliminated by agitating them with nitrogen and maintaining them under an ever present blanket of this inert gas in the tanks.

This is accomplished through use of a valve manifold hookup between the shortening tanks and a battery of cylinders of nitrogen. In operation nitrogen from the cylinders is admitted into the fats through small ports or vents in pipes extending inside and along the bottom of the tanks. Rising gas bubbles agitate the shortening, preventing stratification. At the same time, the nitrogen replaces any oxygen therein.

Use of four tanks—two for each ingredient—permits each unit to be completely emptied for thorough cleaning without interrupting supply.

Use Multiple Refrigerators

In the operation of a bakery, refrigeration is also one of the essential unit operations. This plant's cooling requirements amount to 125 tons, which are satisfied by numerous individual units rather than from a central supply. It was decided that use of smaller, multiple units at spot locations in this plant would provide greater flexibility and higher efficiency since they are operated only according to need. As installed, refrigeration units are assigned as follows: One for each of eight dough mixers, one for the fermentation room; one for each of four separate ingredient storage rooms, which are maintained at two different temperatures (2 coolers, 2 freezers), and two on ice-water lines for cooling of ingredients going into process.

III—Process Techniques

Let us now consider this plant's various advanced baking techniques in processing sequence, particularly highlighting the efficiencies achieved through use of automatic equipment.

Up to four different types of dry ingredients are automatically weighed in series—and with robot-like precision—from use bins on the floor above into 1,000-lb. capacity suspended scale hoppers feeding sponge or dough mixers.

Employed are six Toledo Scale Co. batch-type series scales. Photoelectric tubes on each scale assure precision in automatically weighing each ingredient—one after the other—into a scale hopper.

Locks Against Errors

By setting the weight of each ingredient on the scale dial, the mixing foreman can change the flow of ingredients from use bins into mixers to any sequence desired. And after the foreman has set up the desired flow of ingredients into hopper and mixer, he locks the scale so that there is no possibility of errors.

Now all a mixing operator need do is feed the scaled ingredients in the hopper into the mixer, and then start and stop the machine.

Say that the foreman has adjusted the scale to run flour, milk solids, and sugar into a scale hopper feeding a dough mixer. Now, by actuating a pushbutton, flour is first moved from use bins through vibrating sifter and into scale hopper. As the weight of flour increases in the hopper, an interceptor travels toward the first photocell until it passes under it and cuts off the light. Flow of flour then stops at the predetermined fixed weight.

Next, milk solids are moved from use bins, through sifter, and into scale hopper. The interceptor continues to travel toward the second photocell until it passes under it, cuts off the light, and stops the flow at the proper weight. The cycle repeats until the correct weight of sugar is fed into the hopper.

All three ingredients are then charged into the mixer.

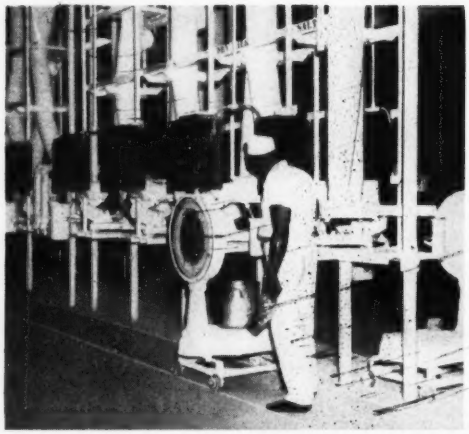
Series batch scales are also employed for automatically weighing white, whole wheat, cracked wheat, and rye flours from use bins into scale hoppers supplying mixers preparing variety breads. These types of bread are made up with a combination of flours along with sugars and milk solids.

Metering Lard

Another advanced ingredient-scaling practice is represented in the facilities for metering melted lard from the four insulated, steam coil-heated 48,000-gal. tanks directly into mixers. Meters are now pre-set for the amount of lard desired, and the product flows from the four nitrogen-blanketed storage tanks through pipes with ¾-in. steam tracer-heater lines and into the mixers.

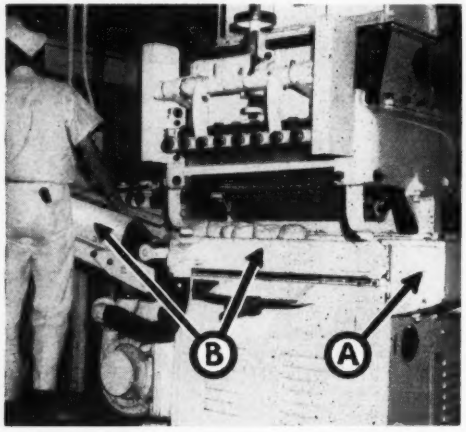
Ingredient and Product Scaling Has Gone Automatic

THIS vibrating unit automatically weighs yeast into bags or pots. Dry yeast is used since it is easier to handle than the wet, which comes in bricks that require counting.



EMPLOYING this automatic dry-ingredient scaling system, two men weigh small amounts of material into stainless pots mounted on mobile scales that ride floor tracks.

DOUGH is dumped through floor-level chute into weigh-hopper in make-up department on floor below. Weight is recorded on strip of paper by Printweigh scale (arrow).



FLOUR DUSTING of dough pieces is not required at six-pocket divider. Special oil bath (A) continuously coats conveyor carrying pieces. Note "anti-stick" blowers (B).

Scaling another ingredient—yeast—has been simplified. Dry yeast is used, since it is easier to handle than the wet product. It requires no unwrapping, counting, and crumbling prior to suspension in water. And it can also be stored for weeks at the bakery without refrigeration.

Dry yeast is now shipped in 300-lb. paperboard drums with metal closures. When needed, it is dumped into a 600-lb. capacity hopper feeding a Triangle Elec-Tri-Pak weighing and filling machine, which scales 8½-lb. lots of dry yeast into paper bags. This amount of yeast is then suspended in four times its weight of water (at 105 deg. F.) in a yeast blender. This unit is equipped with a propeller-type agitator that keeps the yeast in suspension during the 5 min. it takes for rehydration. The suspended, rehydrated yeast is then pumped directly into batch mixers.

Mechanical Scaling Unit

Adjacent to the mixing department is a separate scaling room. Here, without the aid of scoops, small amounts of dry ingredients are automatically weighed from bins on the floor above into 50-lb. stainless steel stock pots.

Significant, too, is the absence of ingredient bags, cans, or drums in this room—a notable space-saving and sanitary feature.

To scale the ingredients—salt, milk solids, Cerelose, cake flour, powdered sugar, and granulated sugar—into a stock pot, a pushbutton is actuated. Then a vibrating feeder discharges material from a chute into the pot, which is mounted on a scale traveling over a pair of floor-level rails. When the indicator approaches the weight desired, another button is pressed to "jog" along, or dribble feed, small

amounts of the material until the correct weight is indicated on the scale.

Greasing dough troughs is another of the many bakery tasks that has been simplified. It's no longer a manual job, for now an Alemite automatic greaser is employed. Operating under about 50 psi., this unit conserves grease while spraying it uniformly inside the troughs.

Electric-Eye Doors

Opening and closing of doors between mixing and fermentation rooms is today accomplished mechanically. Pairs of electric eyes, casting floor-to-ceiling light beams, are installed inside and outside the fermenting room. These doors are automatically opened as dough troughs pass over the "eyes" in the floor and break the light beam. The doors then close when the eye beam is no longer interrupted.

Dough Scale Hopper

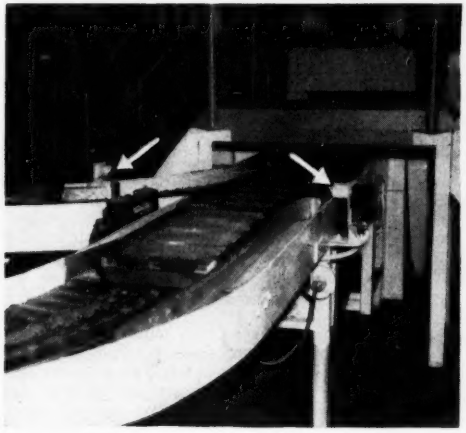
Ingredient control is now assured through installation of four floor-level dough-dump chutes—two for white breads and the other two for variety breads—that feed into scale hoppers between the first and second floors.

When ready for the make-up department, a trough is rolled to a stainless steel chute. A slide gate at the side of the trough is opened and the dough is chuted to the scale hopper supplying the automatic 8-pocket divider. After the hopper is full, the weight of dough is automatically recorded on a strip of paper by a Toledo Printweigh scale.

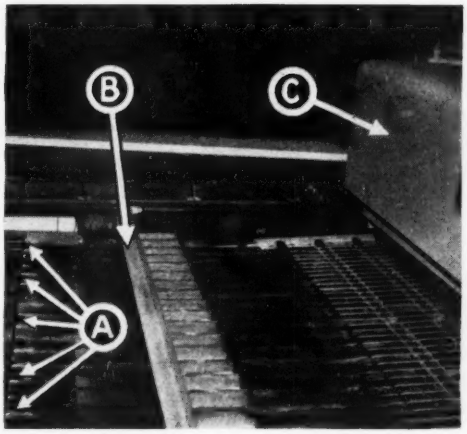
A green light flashes in the make-up room when the hopper is full.

Chuting of dough to dividers is still another simplification. It eliminates the need of trough hoists. A slide gate is merely opened to feed dough from the 2,000 lb.-capacity weigh hopper into two Baker-Perkins eight-pocket dividers.

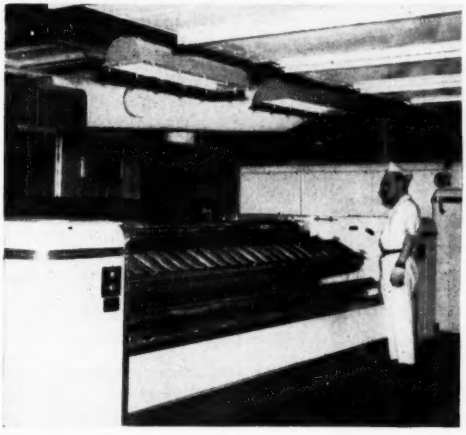
Proofer and Oven Efficiencies Are Engineered



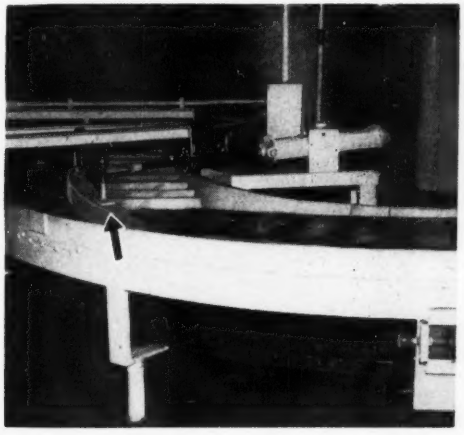
PAN FEEDER, with electric eyes (arrows), delivers pans (from two molder-panners alternately) in single file to final proofer.



GROUPER, with automatic stops (A), assembles six straps of pans. Bar (B) then automatically slides the straps of pans into final proofer (C).

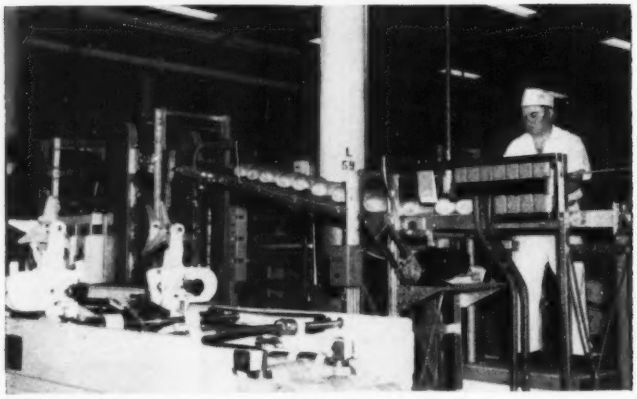


TUNNEL-OVEN depanner dumps bread into chute going to continuous cooler. Empty pans return to greasing unit and then to molder-panners.



AIR-OPERATED GATE alternately separates empty pans coming from depanner and feeds them into two lines to molders. Arrow indicates separating bar.

Special Movers Cut Down Handlings



TIER SELECTOR receives groups of loaves from cooler and alternately feeds them to four slicer-wrappers. Overflow goes to sorting tables.

FROM each slicer-wrapper, loaves go on four-tier Wendway conveyors that take them to shipping dock.

ARRIVING at shipping, wrapped bread is sorted at several stations, then loaded into trucks for immediate delivery.

Dough fills the pockets, and it is cut by a reciprocating knife. Pistons then eject the volumetrically measured dough onto a wire-rod continuous conveyor. The divider forms 40-160 18¾-oz. dough pieces per min.

Air-Dusting Dough

Substitution of compressed air for dusting flour and the installation of an oil bath for coating the conveyor feeding dough pieces from divider to automatic rounder have prevented downtime due to sticky doughs. The divider is equipped with two air blowers—one supplying air to dough pieces on the divider conveyor and the other blowing air on the inclined belt feeding the rounder.

The latter conveyor travels at twice the speed of the divider belt. And in so doing it pulls the dough pieces apart so that they can be individually rounded.

Through the use of Teflon-coated rounders, further need of dusting flour is omitted.

After leaving the five-pocket intermediate proofer, dough for white bread goes to two Baker-Perkins automatic molder-panners that shape and deposit the unbaked loaves into greased pans.

Automatic Pan Feeder

Panned dough continues to an automatic feeder-conveyor that alternately takes straps of four pans from the two molder-panners and delivers them on one line for loading into the final proofer.

On each roller conveyor carrying straps of pans from the molder-panners are automatic stops. By means of an electric eye arrangement, pan stops are alternately opened and closed to form a single line of pans going to the final proofer. When a strap of pans passes over a stop and breaks the beam, the pan stop on the other line is closed. And when the beam is no longer interrupted, the alternate stop opens to permit pans to continue from the other conveyor.

There are two outstanding engineering improvements in the twin-tunnel Baker-Perkins final proofer—automatic loading and unloading of straps of pans, and the installation of four conditioning zones.

Proofer Loading, Unloading

The automatic pan grouper loads six straps of pans at a time into the proofer. It's done in this manner:

The first strap of pans strikes an end stop, and this action automatically elevates a stop for the second set of pans. Individual stops continue to

turn up in rotation as succeeding pans strike the stops. Finally, when the sixth strap of pans is in position for loading into the proofer, a final stop is raised to prevent additional pans from traveling into the grouper.

At this point, a pusher-bar mounted on a pair of chain belts slides the group of pans into the proofer. The bar then travels back to receive another group of pans. However, the bar does not sweep the pans into the proofer until the last stop (actuated by the sixth strap of pans) comes up.

At the discharge end of the first 165-ft. leg of the proofer alongside the oven, an electro-magnetic bar pulls the row of pans from the unit and deposits it onto a transverse conveyor. Another grouper now automatically loads the row of pans into the second 125-ft. leg of the proofer. This leg travels in the opposite direction to the first leg of the proofer.

Still another magnetic bar pulls the row of pans out of the second leg of the proofer, ready for automatic loading into the continuous oven. Travel through the final proofer takes 55-65 min.

Adjustments for Proofing

The second innovation—varying of the proofing time—is accomplished through installation of four conditioning zones and variable speed drives on proofer conveyors.

Temperatures and relative humidities in each zone can be adjusted to alter proofing conditions. And the speed of the conveyors can be changed to vary the proofing time.

Thermostatic Oven Controls

Now the pans continue through a heavy oil-fired, diathermatic 120-ft. tunnel-type Baker-Perkins oven with a grid conveyor. This unit is equipped with modulating temperature controllers that automatically deliver the required amount of heat into the oven, controlling quality and conserving fuel.

Automatic Depanner

Baked bread is now automatically removed from pans. Employed is a tunnel-oven depanner. Here's how the automatic depanner operates:

Rows of pans discharged from the oven slide onto a 4-ft. live roller bed that carries them to a vertical stop bar. Each row is then automatically transferred onto a tilting plate. Gripper fingers travel through slots between the plate and hold the pans as the tilter rotates forward about 150 deg. At this point, the bread falls from the pans and is chuted for loading onto cooler trays. Now, the tilting plate travels backward 170 deg. to discharge the empty pans onto a metal slat-type conveyor.

Bread is mechanically deposited onto cooler trays. Each tray coming into position receives a row of 24 loaves.

Pan Separator

Empty pans are cooled as they are conveyed in two lines from the depanner to automatic greasers and molder-panners. Separation of pans into alternate rows from the depanner is achieved by an air-operated separating gate. Operation of the gate is timed with the depanning tilting plate. And between each row of pans there is about 2 ft. of space to permit the gate enough time to swing from one row of pans to another.

Advanced Bread Cooler

Continuous cooling of baked bread is accomplished by means of an air-conditioned, tray-type Baker-Perkins cooler that features automatic temperature and humidity controllers and a mechanical tray washer.

Bread travels through the cooler in 90 min. Starting below the second floor, the bread moves horizontally 25 ft. It is then elevated 24 ft. to the second-floor, where four 185-ft. runs are made in the air-conditioned section of the cooler. Here, the amount of cooling and also moisture of the finished product are automatically controlled.

Self-Washing Cooler

The cooler is also equipped with an automatic tray-washer, located in the horizontal, non-air conditioned section below the second floor. The washer is put into operation only during weekends.

Washing is carried out in this way: Cooler trays pass between a spray-nozzle pipe that discharges hot water under fairly high pressure. Excess water is then drained as the trays are raised in the elevated section of the cooler. And circulating fans in the air-conditioned section of the cooler completely dry the trays.

Just a few words about the variety bread line: Dough travels from an 8-pocket divider to a rounder, intermediate proofer, and two molder-panners. Panned dough is then loaded onto racks that are mounted on overhead monorails in the final proof box. After proofing, the pans are fed to a 90-ft. traveling oven. Bread is then depanned and fed to a continuous cooler that carries it to four automatic bread slicers and wrappers.

Installation of two remote-controlled, automatic tier-selecting units has eliminated handling between the coolers and slicer-wrappers and, at the same time, it has stepped up production flow.

Automatic Tier Selector

Designed by Union Steel Products Co. for use with automatic overhead bread-cooling units, these tier-selectors receive loaves in groups as they are released from coolers. Upon arriving at a selecting unit, loaf-groups are momentarily held until an electrically controlled, hydraulically actuated conveying bridge reaches the predetermined tier level. Then the group of loaves moves rapidly across the 6-ft. bridge to the 8-ft. five-tier sections that retard and regroup the loaves for smoother feed to the slicers.

After one group of loaves has crossed, the selecting bridge immediately changes position to transfer another group to a different slicer-tier.

One man operates a tier selector to control the feeding of groups of loaves of white bread to a battery of four automatic bread slicers and wrappers. Overflow moves on to the fifth tier, which feeds the bread to a sorting table.

The second tier selector operates in the same manner as the one used for white bread, except that this unit feeds variety breads from overhead cooler to four automatic slicers and wrappers.

From each battery of slicer-wrappers —four for white bread and four for variety breads—wrapped loaves are fed to four tiers of Wendway conveyors. These multiple-tier units deliver the bread to different stations at the shipping dock for rapid distribution.

Lab Control Measures

Before concluding, a word about quality control measures carried out by the laboratory: Here, all incoming ingredients are analyzed for adherence to specifications. And those not meeting specifications are rejected.

Here, too, test baking is conducted on a small scale, with ingredients used in the same proportion as employed on a commercial scale. And if the tested product proves satisfactory, mass production follows.

Employed in the laboratory are home economists who test goods made in the bakery. They carry out organoleptic tests—the various goods being examined for their appearance as well as for their eating quality.

If the home economists are satisfied with the quality of the baked goods, then it is assured that the customer will be pleased.

COMPACTNESS keynotes new filling and packaging line for handling 2, 6, 8 and 16-oz. bottles of bitters.

Problem: Meeting New Demands for Old, Famed Product

Solution: Modernization

Broader food uses of its historic essence meant Angostura-Wuppermann had to re-shape and amplify its production. It did it with advanced filling and packaging line—cut labor, saved space, too

PRISCILLA A. TRUAX
New Packages Products Editor, "Food Engineering"

Installation of a new $50,000 bottling and packaging line has brought numerous benefits to Angostura-Wuppermann Corp., New York City.

It has enabled reduction in the number of employees from 22 to 8. It has provided a 100 percent increase in production capacity. And it has eliminated the need for additional floor space, since the new, advanced setup requires less than 50 percent of the area previously used.

And now for the story:

Since it was first made 131 years ago, the product Angostura aromatic bitters has been known the world over as an ingredient of cocktails and other mixed drinks.

Now, however, its use as a food seasoning is also gaining wide recognition, as evidenced by the large increase in sale of the 2-oz consumer-size bottles.

It was found that the semi-automatic packaging line that had been ample for the large bottles (6, 8, and 16 oz.) was unable to keep pace with the increase in demand for the smaller package.

After careful study, the company decided upon a modernization program.

First step was the purchase of a Yale & Towne "Worksaver" lift truck to handle the 49½-gal. wooden barrels of bitters (weighing approximately 450 lb. each) upon their arrival at the New York plant from Port of Spain, Trinidad, B. W. I.

Previously the barrels were handled manually. Now the lift-trucks easily stacks them to a height of 9 ft. in the storage area. This unit alone has saved at least 8 man-hours per day.

For removal of the bitters from the barrels, a special rack has been constructed directly above a stainless steel receiving tank. On this rack are two barrel cradles equipped with inverted welded-steel casters. Filled barrels are placed in the cradles by the lift trucks. The bungs are loosened, barrels inverted and allowed to drain into the receiving tank.

When empty they are removed by fork truck and replaced with other filled barrels.

From the receiving tank, the liquid is pumped through an F. R. Hormann filter to remove any sediment, particularly particles of charcoal from the inside of the charred barrels. Then it goes into one of the two 500-gal. glass-lined Pfaudler storage tanks.

These tanks are elevated to permit gravity flow of the product through plastic and stainless tubing to filler.

Filling Operation

At the start of the line, empty bottles are removed from the paperboard cartons, in which they are received and then placed on a conveyor that feeds to the cleaner.

In this unit, bottles are rotated into the machine in a synchronized line permitting constant-speed operation. Properly spaced guides hold the bottles and turn them to an inverted position, then a blast of compressed air enters their necks to remove any dust that may have got into the bottles. At the end of the rotative cycle, the bottles are returned to a vertical position and delivered onto a discharge conveyor feeding to the filler.

A Karl Kiefer vacuum rotary, 12-stem filling machine, with a capacity of approximately 80 gal. per hr., handles the 2, 6, 8, and 16-oz. bottles. The liquid flows from one of the 500-gal. glass-lined storage tanks to the float-controlled supply tank of the filler. Bottles are sealed and air withdrawn from them. With reduced pressure in the bottles, the liquid is drawn into the containers in the correct quantity, the overflow returning to the supply tank, while the air escapes through the vacuum pump.

From this point the bottles discharge onto a conveyor leading to the capping machine.

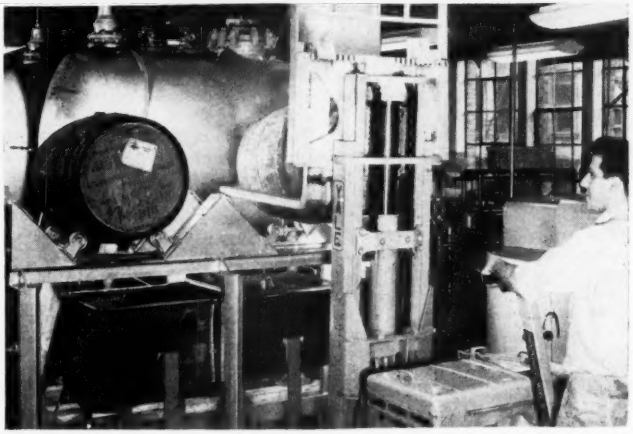
New Closure Adopted

A substantial saving, in man-hours and lower cost per unit through operation of a now nearly automatic line, was made possible by changing the type of pourer which is inserted into the neck of the bottle for use of the consumer.

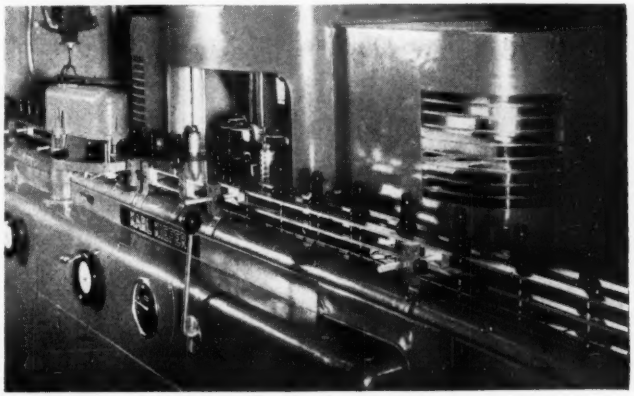
Formerly, a cork (with a small hole in its center) was employed to facilitate pouring. Insertion of the cork was a hand operation that required one operator. This type pourer has now been replaced with a plastic one that is machine-inserted at the rate of 60 per min., after which plastic screw-type caps are automatically applied on the bottles.

Moving along the conveyor, the

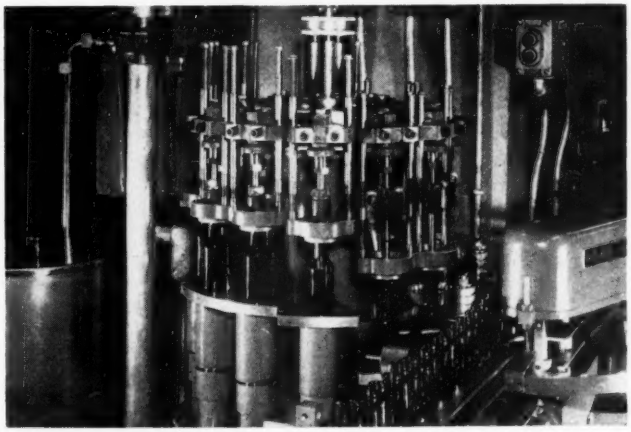
Receiving, Cleaning, and Filling Operations



FROM BARRELS liquid goes to receiving tank, is filtered, pumped to storage.



EMPTY BOTTLES are conveyed at constant speed into an air-pressure cleaner.



ROTARY 12-stem unit fills bottles under vacuum at rate of 80 gal. per hr.

Behind the 131-Yr.-Old Still-Growing Product

The pungent, mahogany-colored essence — Angostura Bitters — is formulated from a secret blend of tropical spices, steeped in old rum, exactly as it was first prepared by Dr. Johann Gottlieb Benjamin Siegert when he was General Simon Bolivar's surgeon general during the Latin American "Wars of Liberation" in 1820.

The product is made exclusively in Port of Spain, Trinidad, B. W. I., by Angostura Bitters Ltd. Distributors for United States, Canada, Mexico, Cuba, Hawaii, and the Philippines is the Angostura-Wuppermann Corp., New York City, which handles 80 percent of the processing company's output.

In addition to the product's use in drinks, food processors for years have used it in prepared meats, pie fillings, canned soups and stews, accounting for about 6 percent of the supply. Realizing the potential in consumer trade the company launched an extensive campaign to instruct the housewife on the use of bitters as a kitchen spice for seasoning foods.

To meet the increase in sales volume, the New York company, which does its own bottling and packaging from oaken casks of the product shipped from Trinidad, found it necessary to revamp its entire setup.

bottles pass through two Pony Labelrite machines, one applying the neck label, the other the body label. Here, too, attention was given to means and methods of streamlining the operation.

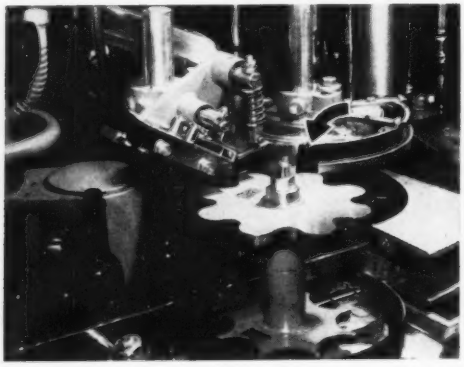
The former body label was wrapped around the bottle and folded underneath by hand. This has now been replaced with a wrap-around type label that leaves a small space on the lower portion of the bottle. Also, the entire bottom of the bottle is uncovered.

This innovation was adopted not only for speed on the production line but also because surveys indicated that the old style was not satisfactory from a selling standpoint. The bottles were difficult to stack and the user was unable to see when the bottle was empty.

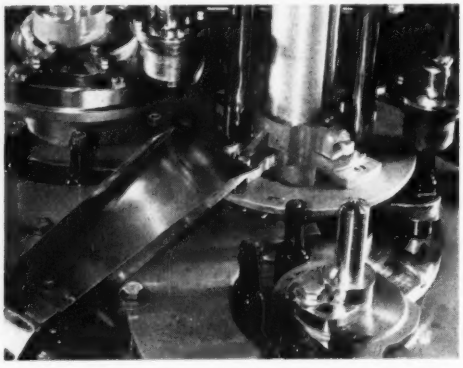
From the labelers, the bottles are conveyed along a line where an operator quickly inserts a cellulose band over the screwed-on closure. These bands are taken out of a liquid and placed on the bottles wet. They dry within a short time, forming a tight seal that protects product from contamination, tampering, and leakage.

The bottles are cased manually, then the containers move through a Standard-Knapp automatic sealing machine and to the end of the line, where they are palleted and transferred to the storage and shipping areas.

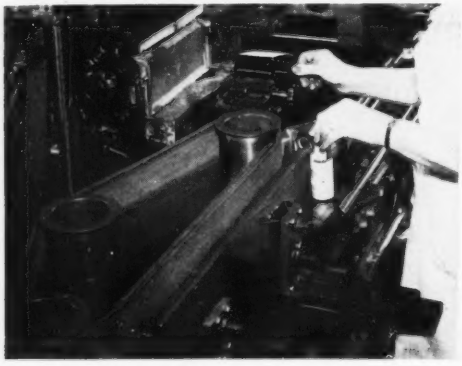
Capped and Labeled Product Is Readied for Market



IN NEXT STEP, plastic pourers (arrow) are automatically inserted into necks of filled bottles.

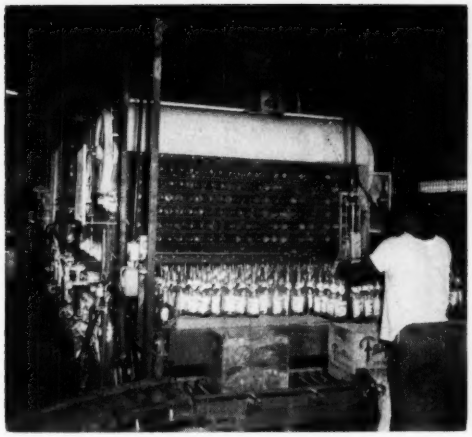


SCREW-TYPE plastic caps are then applied at this capping station, with imperfect bottles rejected.

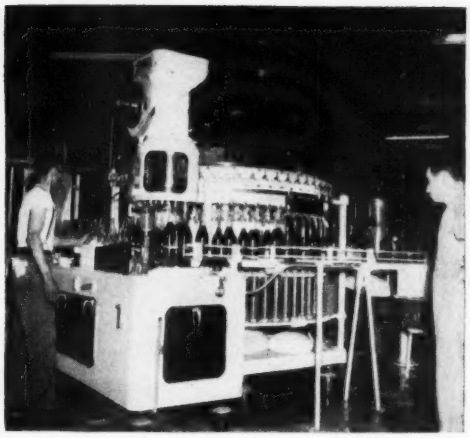


ONE of two labelers, this one applies body label. Unit at preceding station handles neck label.

SHOWN are the popular 2-oz. bottles, together with new cartons designed especially for display purposes.



SPECIAL. 24-wide quart, 6-compartment bottle cleaner is one of key units on 240-a-min. quart bottling line.



PACE-SETTER is this 60-spout filling machine. Unit is hooked up with 10-head rotary crowner.

Fastest Quart Beverage Line

By installing 6-compartment, 24-wide bottle cleaner and 60-spout filler, Detroit bottler increases output four-fold—from 60 to 240 per minute

JOHN V. ZIEMBA
Assistant Editor, "Food Engineering"

Latest development in the bottling field is the exceptionally speedy line at Feigenson Bros.' Detroit plant. Reported to be the fastest quart line yet assembled, it is turning out 240 bottles of carbonated beverages per minute.

This spanking new line features a 60-spout rotary filler connected with a 10-head crowner and a 6-compartment, 24-wide quart bottle washer. Both the filler and the bottle cleaner were developed by Geo. J. Meyer Mfg. Co., Cudahy, Wis.

Also contributing to the efficiency performance are an oscillating unscrambler, manually operated pneumatic case unloader, 4-unit tandem labelers, and a fully automatic premixing system.

While the 60-spout filler is not presently used for pints, it has a potential —if empties can be fed to it fast enough—of 400 per min. And with this output, such a pint line would be the fastest yet.

Formerly, a 12-wide quart-bottle soaker and a 40-spout filler handled only 60 qt. per min. And now, using the same number of workers, the new line has four times the capacity of the previous one. Yet, the new line occupies only half again as much floor space.

Feeding Empties

First production-speeding unit is the manually operated case unloader. Employing this pneumatically operated device developed by Standard-Knapp, one man removes 12 empty quart bottles at one time from a case and deposits them onto a wire-mesh belt feeding the Taylor unscrambler —the second labor-saving unit. Here, 24 vertical oscillating-type dividers automatically line the empties into 24 rows.

THESE four tandem labelers, each operating at rate of 60 per min., speed output on new bottling line.

Bottles are now fed, 24 at a time, into pockets mounted on a chain belt, which is motivated through a series of sprockets. These sprockets are located within the new 6-compartment cleaner. In this unit, bottles get a pre-rinse, five soakings in hot caustic solution, one fresh-water rinse, outside-bottle brushing, two underspout rinsings, two inside brushings, and a high-pressure jet rinsing. Cleaned bottles are then discharged onto a pallet-chain conveyor that feeds them single-file to the 60-spout filler.

Now just a few words about the pre-mix system. Filtered water is first chilled to 55 deg. F. in a plate-type, ammonia-refrigerated cooler, reducing the load on the subsequent cooling and carbonating unit. From here, the water is pumped to the deaerator, which removes air under 27-28 in. of vacuum.

In manufacture, the latter unit was

(*Turn to page 146*)

THIS SLEEK "aircraft bodied" truck has now been proved out in road tests. Two curb-side doors are seen at (A). Rub-rails are indicated at (B).

PALLET-LOADS of beer are easily loaded via hinged platform (arrow).

New Aluminum-Body Truck

Totes Bigger Loads...Speeds Handling...Cuts Maintenance

DESIGNED for city beer distribution, new lightweight, aluminum-bodied trucks are proving their worth in the metropolitan New York area.

One fleet of 325 units is in operation at the Liebmann Breweries, Inc., of Brooklyn, N. Y. Custom-tailored especially for local beer delivery by aircraft-famed Grumman, the trucks offer specific structural and operational advantages.

▶ **STRUCTURAL—Sizable reduction in tare weight, allowing for greater payloads through better utilization of available volume . . . Excellent body strength and rigidity . . . Improved flooring, with woven mat material over aluminum decking . . . One-third reduction in turning radius . . . And unique design and strategic placement of five body doors.**

▶ **OPERATIONAL—Use of fork trucks for palletized beer handling . . . Speedier delivery handling as a result of improved accessibility to trucked product . . . And reduced maintenance.**

Weighing 2,700 lb. less than the company's predecessor—a wood and steel body mounted on conventional truck chassis—the aluminum unit is coupled with the newer type cab-over-engine chassis. The model finally chosen as standard is 20 ft. long and weighs 11,400 lb. (as against 14,100 lb. for the older one).

Both the body and chassis changes contributed to the overall weight reduction—the new body being 1,800 lb. less than the wood-steel job and the cab-over-engine chassis (White #3000 with 181 in. wheelbase) 900 lb. less than the conventional (214 in. wheelbase). The body flooring is also aluminum, but is covered with matting material such as used on the conveyor belts inside the brewery.

Cost of the aluminum body runs about $2,200 for the 20 ft. size. Since the weight is 2,200 lb., this figures out at $1 per lb., or $110 per running ft. Comparable bodies of wood and steel cost about three-fourths as much. However, Liebmann is of the opinion that the higher first cost will be more than compensated by economies of a larger payload and reduced body maintenance.

Road-Tested Dimensions

The 20 ft. body is considered close to optimum for city deliveries—obsoleting earlier 14½-ft. and 16-ft. models. Built by the J. B. E. Olson Corp. of New York City, it was designed by Grumman Aircraft Engineering Corp. to provide requisite rigidity.

The bodies are used for straight loads of kegs, loads of cases, and for combination loads of both kegs and cases. Cases ten high, are pallet loaded through the rear end with industrial fork-lift trucks.

Each body is roughly 20 ft. long, 8 ft. wide, and 7 ft. high. Inside a set of removable stanchions prevent stacked cases from toppling into clear aisle spaces maintained to expedite deliveries.

The floor is made of 24ST* aluminum sheets ¼ in. thick supported by 24ST channels 3 in. deep with 1¼ in. flanges. These channels, ⅜ in. thick, are placed on 20 in. centers and attached to the top of the body subframe.

When loaded to the maximum, the body floor has a ¾ in. deflection. Recovery is immediate, however, upon removing the load. No permanent deformity has yet been found in any of the metal floors. The unique ¼ in.-thick conveyor-belt type mat floor covering is one of the outstanding features of the floor deck (3M rubber cement, type EC870, is used to fasten it in place).

* The "24" in this code designation indicates the aluminum alloy composition; the "S" signifies that it's a wrought type; and the "T" means the alloy has been hardened by heat treatment.

Over a three-year period (for the oldest bodies), the floors with the mat covering have demonstrated remarkable strength and durability. This has been shown by their resistance to cuts due to broken bottles and hard wear by the fork lifts. And the latter can be very rough, with their weight running to 4,000 lb., plus pallet loads up to 2,000 lb. Under similar service, life of 2 in. thick oak floors has been known to fall short of six months.

The truck's sides, front, and rear ends are also made of 24ST aluminum—sheets ⅛ in. thick, riveted together. All corners are rounded to a 6 in. radius. There are no interior support members to interfere with the pallets or the fork-lift trucks—all supports and stiffeners being external, except at doors and roof.

Employed are longitudinal stiffeners 3 in. wide. These are of rub-rail design and have flat flanges for riveting. There are three—one at the floor line, one 18 in. above the floor, and one at the top where sides are joined to the roof.

The roof, also of 24ST (¼ in. thick) is bowed slightly outward. It is joined to the sides with rivets. Roof support is provided by internal 1 x ¼ in. "T" sections laterally placed on 20 in. centers.

Doors Provide Access

All told, the body has five doors—two rear, two on the right or curb side, and one on the left side. The two side doors nearest the front of the body, one on each side, are directly opposite each other.

The front edge of each of these two is 38 in. back from the front of the body—this distance being the exact width of a pallet. This permits two pallets to be loaded, side by side, in the extreme front end without encroaching on the transverse aisle space between the front doors.

In loading, the space between the two front side doors may be kept open as a transverse aisle across the body. This ailse provides access to the beer on the front pallets for ready unloading through either front side door.

The transverse aisle provides space for empty cases picked up at the delivery points prior to stacking them on empty pallets for the trip back to the brewery). The aisle space also enables the driver to select different packaged goods or products from his load.

Doors Swing Free

The additional two full-width rear doors and second side door on the curb side give other points of access. The rear door hinges are mounted on the two vertical corner members of the body so that the doors swing back flat against the outside. This provides a clear entrance for the lift trucks.

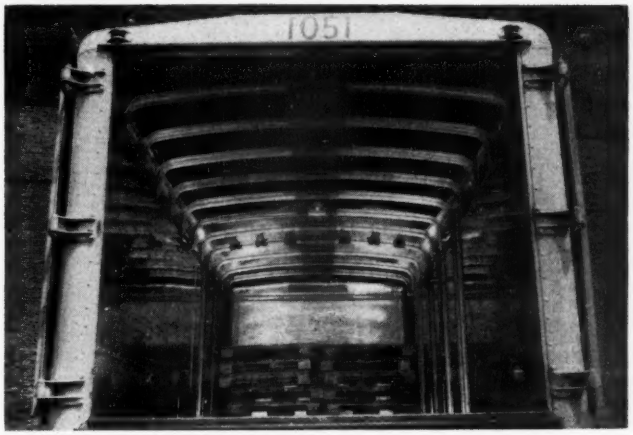
All the doors are made of ⅛ in. thick 24ST sheets, as is the rest of the body. Two vertical rub-rail stiffeners are riveted to each door—one along the forward edge and one along the rear edge of the side doors and along the center and outside edges of the rear doors.

Stanchions Form Aisle

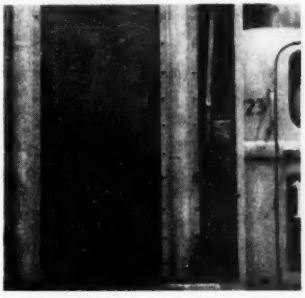
The removable, vertical pipe stanchions, made of 2 in. aluminum pipe, may be placed inside of the truck body to form an aisle and, as stated, prevent cases or kegs from falling. They slip into special slots in the ceiling and holes cut in the body floor and matting.

These staunchions are fitted at the upper ends with spring latches, enabling their quick installation or removal. They are, of course, only needed when aisle space is desired.

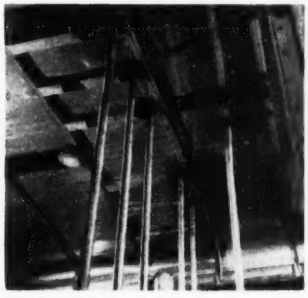
Closeups Highlight the Details



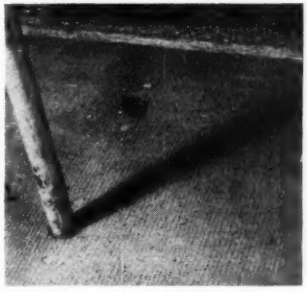
INTERIOR of truck is clear of any "space robbers." Special roof bows and free-swinging rear doors provide plenty of room for pallet movement.



ALUMINUM doors are stiffened with two rub-rails riveted to inside.

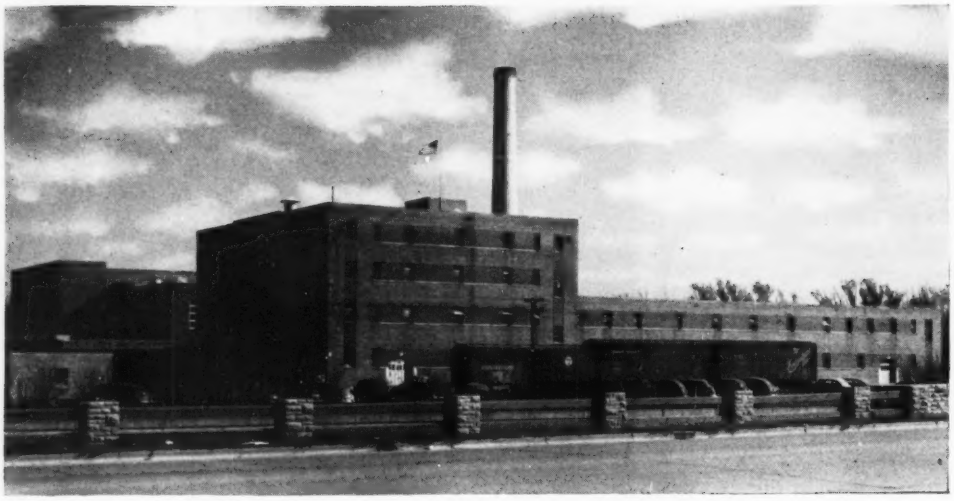


REMOVABLE stanchions are snapped into ceiling locks for aisle dividers.



BOTTOMS of the stanchion pipes are inserted into holes in floor matting.

Truck detail photos on this page courtesy of Fleet Owner magazine, McGraw-Hill Publishing Co.



MORE than 1,000,000 lb. of milk are processed daily in this huge plant of the Rochester (Minn.) Dairy Co-Op.

They've Built Broad, Profitable Markets by

CREATIVE PROCESSING

Exploring—and acting on—promising products, and staking out new sales areas, has proved a "dollar-practical" policy at Rochester Dairy Co-Op. In fact, it has won the company top rung in its field

FE STAFF

Many salient factors have contributed to Rochester Dairy Co-Op's emergence in the forefront of the specialized milk-product field—marked by its striking daily processing of a 1,000,000-lb. milk flow into no less than 35 different products.

Primary, of course, is the Dairy's ideal location—in the heart of the country's cow population. And its know-how and skill in pioneering the use of new technics has been the rounding factor sparking the outstanding growth.

Two basic policies, however, are consistenly related in the company's notable climb—

1. Its ready development of special products which meet the consumer's local market conditions, preferences of taste, and regional competitive challenges.

2. Its coupling of new, "tailored" products with intensive sales promotion and customer literature.

In fact, the company has enterprisingly worked out "variations" to suit its customers—and then has proceeded to sell them on the black-ink side of the ledger.

17 Ice Cream Mixes

One of the most popular of the company's lines is a group of 17 different ice cream mix powders.

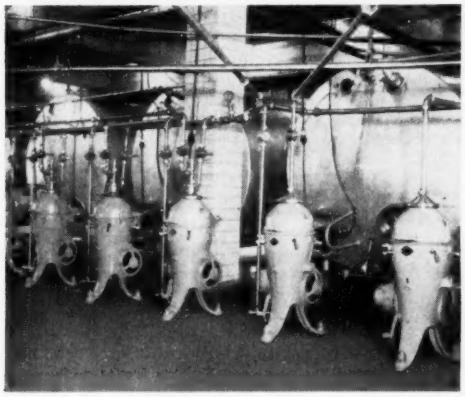
Foremost seller here is a product known as "Sof-Serv", a powdered ice milk containing 6 percent butterfat. This water-reconstituted powder requires no refrigeration during shipment and storage, and it keeps excellently for as long as six months. Because of this it is popular with counter freezer distributors and movie theaters. But its biggest potential currently appears to lie in export—to the distant tropical areas of the world.

"Sof-Serv" consists of milk solids, fat, sugar, vegetable stabilizer, phosphate salts, and flavoring. All constituents except the sugar are vat mixed and pasteurized. Homogenization and evaporation precedes spray drying, where moisture content is reduced to less than 1 percent. Sugar is then blended-in and the dry product is nitrogen packed in 25 lb. and 4½ lb. tins.

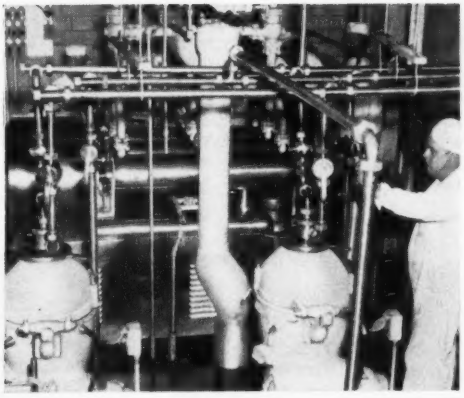
Each production run of this mix is tested for freezing and whipping properties. And just before packaging, each lot must pass rigid tests for flavor, fat, bacterial count, moisture, solubility index, and keeping qualities. Also, samples from batch runs are frozen in the test kitchen counter-freezer to check on finished product consistency and flavor.

Another increasingly popular item is the company's plastic cream. Sale of this product has paralleled that of the ice cream mix line, since the use

End Products Are Plastic Cream and Powders

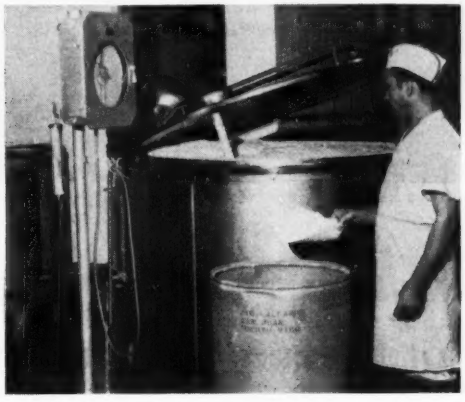


BATTERY of separators produces 40-47 percent cream from fresh milk supplied from tanks (rear).



CREAM is converted to plastic in separators (front), chilled in Votator (rear), then filled in fiber drums.

DRIED dairy products, packed in cans and drums, move into warehouse on conveyors and fork-trucks.



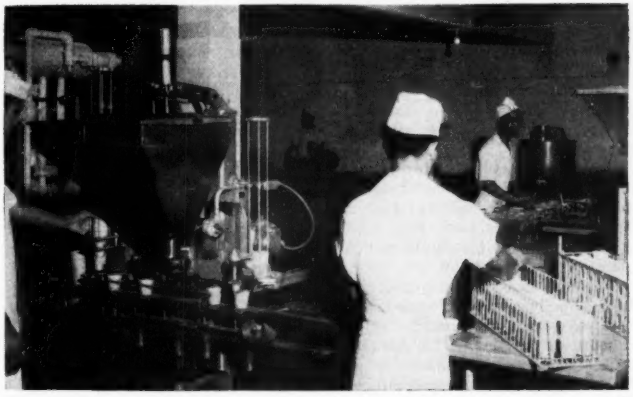
EASE of reconstituting ice cream mixes in water is demonstrated in this Puerto Rican creamery.

is primarily for supplementing the butterfat content of long-keeping, low-fat mixes.

Plastic cream is made from fresh milk that is first separated to 40-47 percent butterfat by a battery of six De Laval units. The cream is then preheated to 92 deg. F. in a Ste-Vac unit and vat pasteurized at 170 deg. F. for 30 min.

After pasteurization, the hot product is piped to a special tile-lined room on the floor below. Here, eight De Laval separators further concentrate the cream to 80 percent butterfat. A Votator then cools the product to plastic consistency at 70 deg. F. Rate: 2,800 lb. per hour.

Filling into 38½-lb. fiberboard drums follows, with these being conveyed to a −20-deg.-F. air-blast room for quick freezing. Reason for filling at the



FREEZING of reconstituted mix and packaging of frozen product are carried out in same Puerto Rican plant with conventional American equipment.

relatively high temperature of 70 deg. F. is to avoid air pockets in the product (such as appear in Swiss cheese) which cause oxidation.

Very close control is exercised at the final separation, with every tenth package tested for butterfat. Further, a Coleman moisture test is performed at 8-min. intervals. And every 40th package is given a complete bacterial analysis by an attendant USDA inspector.

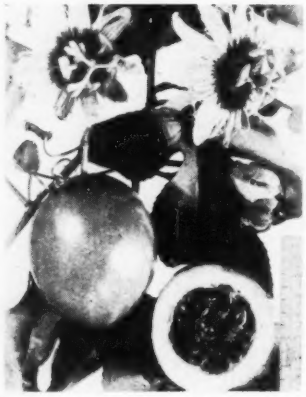
Source of milk for the Rochester operation is 4,000 farms in 24 Minnesota, Iowa, and Wisconsin counties. It is first delivered in insulated vans to six receiving points and 18 member creameries. Then a fleet of stainless steel tank trucks—90 in all—is available to move milk to the central processing plant.

Rochester dairy producers were pioneers in the program of incentive payments for quality milk. Today, each producer still receives extra returns for top quality milk, plus silver stars that are redeemable for household premium items.

Stimulating a quality milk supply in this two fold manner has paid well for Rochester Dairy. Each year more than 100 producers chalk up a perfect quality record on bacteria counts. And several hundred more of them are reported to have records that are only slightly below that point.

• • •

GROWS on trellis-trained vines.



FRUIT, cross section, and flower.

Passion Fruit Is Projected For Frozen Concentrates

H. SEAGRAVE-SMITH

Food Technologist, Department of Soils & Agricultural Chemistry, Food Processing Laboratory, University of Hawaii

Tropical passion fruit (Passiflora flavicarpa) has, we believe, many commercial possibilities, particularly in the frozen field.

Widely used in Hawaii for sherbets, nectars, and punches, the fragrantly aromatic and pleasingly tart fruit appears by our laboratory work to be especially suitable for employment in frozen fruit concentrates.

We have found that blends of pineapple and passion-fruit juices lend themselves nicely to concentrating and subsequent freezing. The combined juices reconstitute to provide an aromatic, sharp, savory beverage which is found to be very palatable as a morning drink.

In our experiments, the initial blend comprised passion-fruit juice and commercially canned pineapple juice on a 50-50 basis, with sugar added to yield refractometer reading of 38.4 percent soluble solids. It is not necessary to add citric acid, since the juice is sufficiently acid.

Three Ways Tried

Using a small, all-glass, laboratory-made vacuum concentrator with a condenser cooled with ice water, various samples were prepared for canning. The average vacuum was 29 in. Hg, while the sample temperature ranged from an initial 82 deg. to a final 88 deg. F. During the concentration, the color of the juice changed from yellow to orange.

These three procedures were tested in preparing the concentrates:

1. The blended juices plus sugar were concentrated to 76.5 percent soluble solids and cut back to 70.0 percent with the addition of a quantity of the initial blend. After thorough mixing, the samples were packed in glass jars with screw caps, and stored at temperatures of 0 deg., 36 deg. F., and room. The dilution ratio for reconstitution for this test pack was 1 part concentrate to 5¼ parts water.

2. The mixed juice blend was concentrated to 80.5 percent soluble solids and cut back to 40 percent with the initial juice. The resulting product was packed in jars, frozen, and stored at 0 deg. F. Dilution ratio on this was 3 parts water to 1 part of the concentrate.

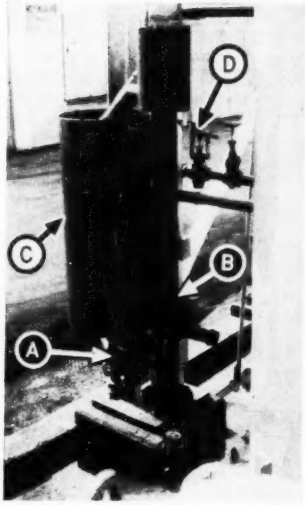
3. The last way consisted of evaporation of the mixed juices to 70 percent—saving the first 10 percent of the distillate for cutting the concentrate back, along with enough additional fresh mixture to make a final 45.5 percent soluble solids. Dilution ratio was again 1 part concentrate to 3 of water.

Storage at both room temperature and 36 deg. F. proved unsatisfactory—only the 0-deg. batches showing any commercial promise. Cuttings of the three procedures were made after an 8 months' storage period at 0 deg. On reconstitution, the samples prepared by methods (2) and (3) were superior in odor and flavor to those resulting from methods (1).

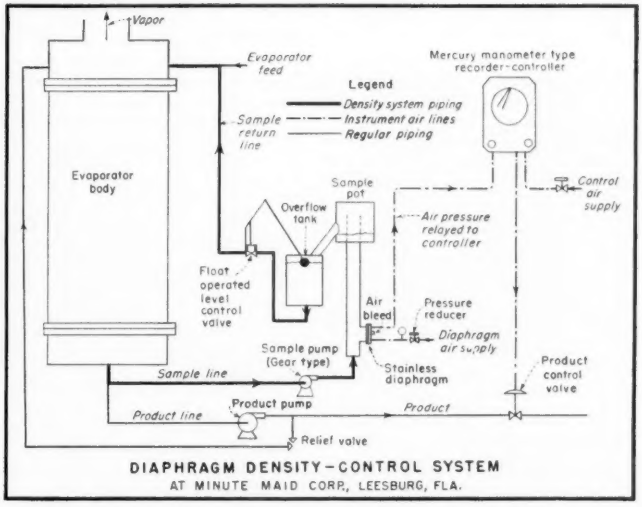
There was no appreciable difference between the samples prepared by methods (2) and (3)—both being normal as to aroma and taste—although not to the extent found in the freshly made blend. All samples cut out at around 11 percent solids with an average pH of 3.3.

The above article is taken from Technical Paper 252 of the Hawaii Agricultural Station, with photos courtesy of Dr. W. B. Storey, University of Hawaii. Financial support for work reported was by funds provided by Grant No. 2 of the Territory of Hawaii Industrial Research Advisory Council.

Molasses Regulation Is No Problem Here



DENSITY is checked by diaphragm (A) on sample column (B). Tank (C) overflow returns via valve (D).



A CONTINUOUS stream is pumped to atmospheric sample pot to be checked for density by the air-balanced diaphragm. Completely automatic, system can be regulated to discharge product molasses within a wide range of densities.

This *Diaphragm* Setup Controls Viscous-Liquid Density

Citrus processor builds accurate, automatic system around a compact, air-cushioned measuring element

HAROLD L. SHAW
Plant Engineer, Minute Maid Corp., Plymouth, Fla.

Our plant faced the difficult problem of controlling the density of citrus molasses while it is being evaporated—and after careful study we hit on a satisfactory solution.

The method we developed calls for the application of a stainless steel, air pressure opposed diaphragm at the bottom of a column of constantly-changing product sample. Such a unit has now been operating successfully for more than a year at our Leesburg, Fla., plant of Minute Maid Corp.

Controlling the density of citrus molasses—a concentrate of the sugar-containing liquor pressed from citrus peel—has long been a hard job. This molasses is not only relatively viscous (even at elevated temperatures), but it exhibits a definite tendency to clog small lines. Also, its purity varies over a wide range, and as a result, its boiling point rise is not constant.

The stainless-diaphragm controller was designed by General American Transportation Corp.'s evaporator division working in conjunction with Taylor Instrument Cos. General American's primary interest was regulation of density of molasses, fish stick-water liquors, and the like, in its multiple effect evaporators.

How Diaphragm Works

Essentially, the new system continuously pumps out a small stream of molasses from the finishing effect to the base of a small vertical pipe column. Employed here is a gear pump. Molasses level is held constant through use of an overflow fountain at the top of the column. The diaphragm is fitted at the base—dead-ending a nozzle placed at right angles to the column.

Eliminates Tedious Job

Density measurement is obtained through balancing the liquid-column weight on one side of the diaphragm with air pressure on the other side. The fluctuations in diaphragm air pressure are relayed to a pneumatic controller, which regulates the product flow from the finishing effect with a throttle valve.

Results obtained with this control system have been excellent. Prior to its installation, standard procedure was to check the concentration by hydrometer or refractometer at inter-

vals of 4-5 min. This involved a large part of the operator's time—which could have been spent more advantageously in attending other parts of the system.

Further, since some underprocessed material was usually delivered to storage, there was always the possibility of fermentation. With the new system installed, however, likelihood of customer complaints because of fermentation has been greatly reduced.

Other advantages: There is no dilution of product because of a water purge, as with a differential pressure type instrument. Also, there is no difficulty with a clogging of parts.

The controller is also little affected by system changes. While it is true that it could be affected by temperature changes, those encountered in practice are not of sufficient magnitude to produce poor results.

Design Aspects

With the diaphragm being physically positioned by the weight of the liquid in the column, it will relay to the controller an air pressure proportional to its deflection from standard position. This is accomplished by a linkage from the diaphragm to an air bleeder valve located on the reverse side. This bleeder valve (being fed with constant-pressure air) will, depending on the diaphragm, either relay the entire supply pressure to the controller, or it will relay only a portion and exhaust the remainder.

It is important that the sample stream be fed at a constant rate. A changing rate will produce a varying sample-column head due to the variations in thickness of material overflowing the pipe and the change in friction head (as the velocity fluctuates). With the sample pump being of the gear type, a constant rate is maintained.

In considering the rate of feed to the column, the sole factor is that it must be sufficiently high so that the system will "read" changes in density as fast as such changes could possibly occur in the finishing pan of the evaporating system. Further, the anticipated density change should be selected from a range slightly higher than the normal product density—for safety purposes.

For example, in a system where the product will contain 72 percent solids (as in citrus molasses), the flow rate should be sized for a density change from 74 to 75 percent solids.

Size Is Important

The column diameter must be sized so the velocity through it will be relatively low, and certainly within the range of streamlined, or laminar, flow. Column height will determine, to some extent the accuracy of measurement, since minor fluctuations in flow rate will have a greater effect the shorter the column. This becomes a problem in percentage.

For example, a change of 0.1 in. in a column 10-in. high would produce a 1 percent error, while the same variation on a 100-in. column would produce an error of only 0.1 percent.

It is also important that the column be of sufficient height so that a reasonable air pressure (2-5 psig.) will balance the diaphragm. This is a function of the specific gravity of the liquid measured.

In our unit, the column is 4 ft. high and the gravity about 1.4. Therefore, the balancing air pressure required is:

$$4 \text{ ft.} \times 1.4 \times \frac{14.7 \text{ psi.}}{34 \text{ ft. water}} = 2.42 \text{ psig.}$$

Constant air pressure should be supplied to the reverse side of the diaphragm, in which case an ordinary manual pressure-reducing valve may be satisfactory. Otherwise, there should be employed a direct-connected modulating back-pressure control valve (common in the gas appliance trade and relatively inexpensive).

Control of sample flow back to the evaporator system is easily accomplished with a float-operated control valve—installed on the tank collecting the overflow from the column. This provides a seal on the return line (if the evaporator is at less than atmospheric pressure) and affords completely automatic operation of the sample pot.

The unit used at our plant records as well as controls. Here, the main control valve in the evaporator discharge line is positioned by the air pressure relay valve, which in turn is actuated by a mechanical linkage connected to a float in a mercury manometer. Air pressure from the stainless diaphragm balances the manometer.

Recorder charts may be graduated as desired, but any chart is satisfactory once the control point is established through actual density determination.

The control valve is in the product-discharge line at Minute Maid, but this valve could be installed in the evaporator feed line for control of the process by diluting the liquid in the finishing pan. Either method is satisfactory, depending upon the actual application.

A "Con" Among the "Pros"

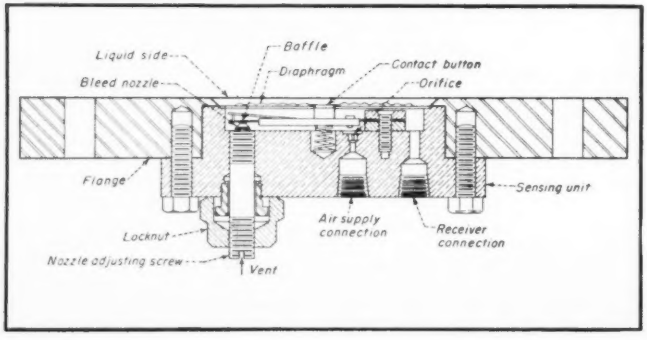
The system has a disadvantage that is common to many instruments that measure and control density—this being that a sample must be physically removed from the system and brought to atmospheric pressure to take a reading.

There are, however, a few other types of instruments which could possibly eliminate this. One is the boiling-point-rise controller. But, as mentioned, variations in purity, and consequent variations in boiling-point-rise of the liquid, make adaption of this type density instrument virtually impossible.

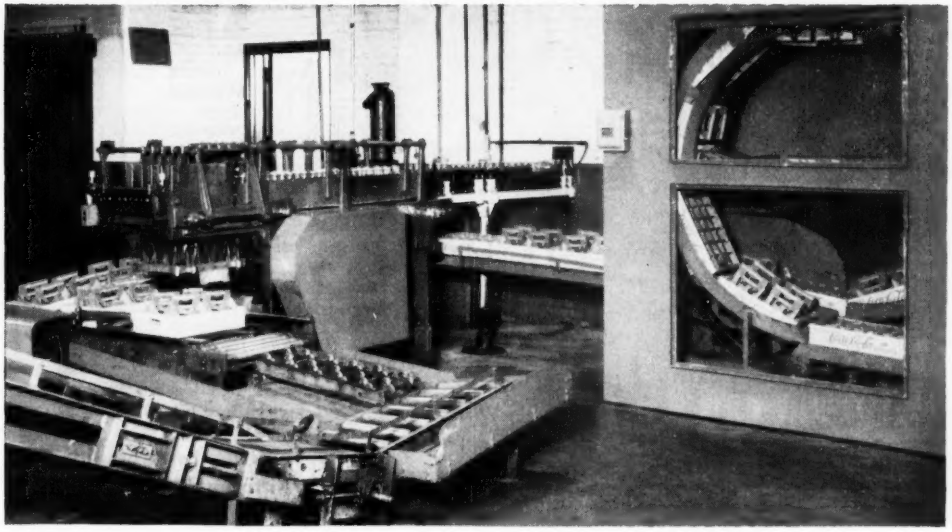
We employed a Taylor Instrument Model "229R" liquid level control; operated in connection with a mercury manometer type recorder-controller. The control valve is a conventional diaphragm-and-spring positioned single-seated globe type. Cost of this equipment was in the neighborhood of $1,000.

The sample pot was fabricated locally of stainless steel (because of corrosive conditions), and its cost was nominal. The float operated level control valve ran about $50, and the sample pump (gear type) and its motor about $65.

Working Details of Rugged Diaphragm



NEW EQUIPMENT & SUPPLIES



Automatic In-Line Unit Simplifies Case Cleaning

Improved housekeeping, labor savings, and reduced case costs are reported for soft-drink operators with use of this recently introduced automatic case cleaner (right in photo).

Unit consists of a closed metal box containing the working mechanism, with two transparent-plastic front doors, hinged for easy access. It requires 19.4 sq. ft. of floor space and as seen above is readily incorporated into most existing bottling lines without modification.

Except for infeed and outlet area, unit is closed, thus promoting cleanliness.

Being a type of conveyor section, it requires little maintenance, while providing effective handling of cases for existing lines.

Cleaner handles cases smoothly. It is equipped with an interlock to prevent damaging jams causing breakage. Unit has been commercially tested for six months at Coca-Cola Bottling Co., Inc., New Haven, Conn.

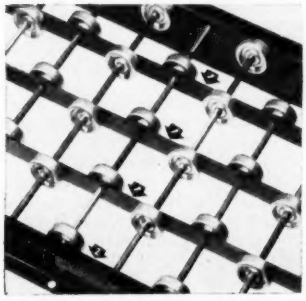
In operation, cleaner receives cases from a conveyor directly through side onto a short belt section for infeed to timer mechanism. Timed case is then engaged by flight lugs on chain conveyor and is propelled around a horizontal spiral.

Chain and lugs provide drive moving case to top of the circle. Case rides on its top against two carrier plates. These plates, sloped toward center, are instrumental in holding 6 and 12 bottle carriers in inverted cases.

As case reaches top of its travel, four jets are timed to release compressed air blasts into it for cleaning. Once over top, case is released by lugs and slides by gravity to off-bearing conveyor located on spiral at bottom of circle.

In middle of circle, a metal hopper and chute collects dirt and debris and delivers it to a door in back for easy removal.—*Standard-Knapp, Div. of Emhart Mfg. Co., Portland, Conn.*

Circle 97A on Reader Service Card



Wheel Gravity Conveyor Carries Bigger Loads

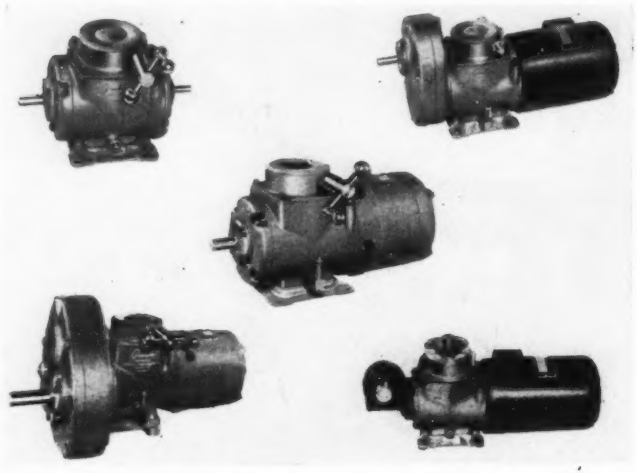
Increased load capacity is reported with this new type wheel gravity conveyor.

New unit has 3½ in. deep channel frames of 12-gauge steel—(2) in photo—for extra strength and rigidity. Each lane of wheels is reinforced with a steel center band—(1) in photo—that supports the axles at the point of greatest strain. These construction features are designed to permit handling of loads up to 1 ton on a 5-ft. section of the carrier.

Conveyor is manufactured in 5- and 10-ft. long sections, 12- and 18-in. wide, and in 45 and 90-deg. curves. It is available with either tubular or channel-type guard rails, or may be used without guard rails for handling materials wider than the conveyor.—*The Rapids-Standard Co. Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich.*

Circle 97B on Reader Service Card

Speed Transmission Units Provide Overload Protection



The new model 18 variable-speed transmission unit is designed for operation at 1,800 rpm. input without the use of auxiliary spring loading.

Its low input speed and absence of spring loading provides overload protection. In event of a jam in driven machine, transmission can be stalled for prolonged periods without damage to machine or transmission.

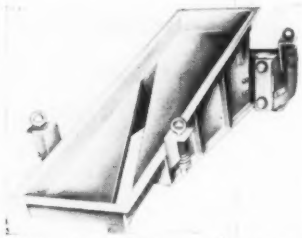
New model is available with many types of controls and reduction assemblies. In accompanying photo, it is shown both with and without motor, also with standard output as well as with built-in worm reduction, single stage and double stage helical spur reduction.

Control shown in photo is micrometer unit furnished as standard with new model. One turn of control handle is made for each of 40 graduations on dial. Handle has 10 graduations, permitting desired speed to be read to 1/400 of dial periphery. Single turn, lever, remote mechanical and electrical controls for speed regulation are also available.

Complete package of variable speed drive, motor, reduction, and control is mounted on driven machine with only four bolts, permitting savings in space and mounting costs. Units in sizes up to 5 hp. are available.—*Graham Transmissions, Inc., 3754 N. Holton St., Milwaukee 12.*

Circle 98A on Reader Service Card

Vibrating Unit Feeds Curtain of Material



Granular products, such as nut meats, can be fed to next unit in line in a continuous curtain by this new style vibrating spreader-feeder.

Made up with a flat pan trough having a diagonal slot (see illustration), unit is powered by a single electromagnet drive. Latter may be mounted either above or below trough, depending upon space available.

Rate of feed is controlled from turn-knob in separate box.

In operation, feeder's vibratory action sends flow of material out along trough, discharging it along edge of slot to form a constant curtain two to four times width of original stream.

Feeder is available in several sizes and capacities. — *Snytron Co., 460 Lexington Ave., Homer City, Pa.*

Circle 98B on Reader Service Card

Sealed Ball Bearings Are Interchangeable

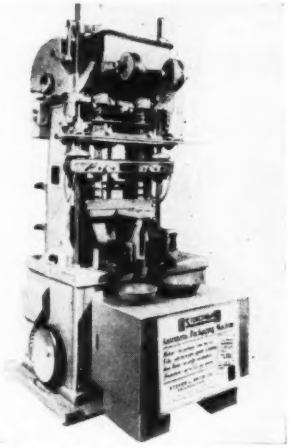
To keep dirt out and lubricant in, new sealed ball bearings have been designed that are interchangeable with non-sealed units.

Maker says effective sealing is provided, with light contact and low friction. Seal is extended below the steel retaining ring, forming a flexible lip that touches a smooth uniform chamfer of the inner ring.

Retaining rings have circular-formed ribs for rigidity, and are staked securely during manufacture. Bearings are delivered factory-lubricated. They are supplied in standard single-row rings and metal shields.—*SKF Industries, Inc., Philadelphia 32.*

Circle 98C on Reader Service Card

Liquids, Semi-Liquids Auto-Packaged in Film



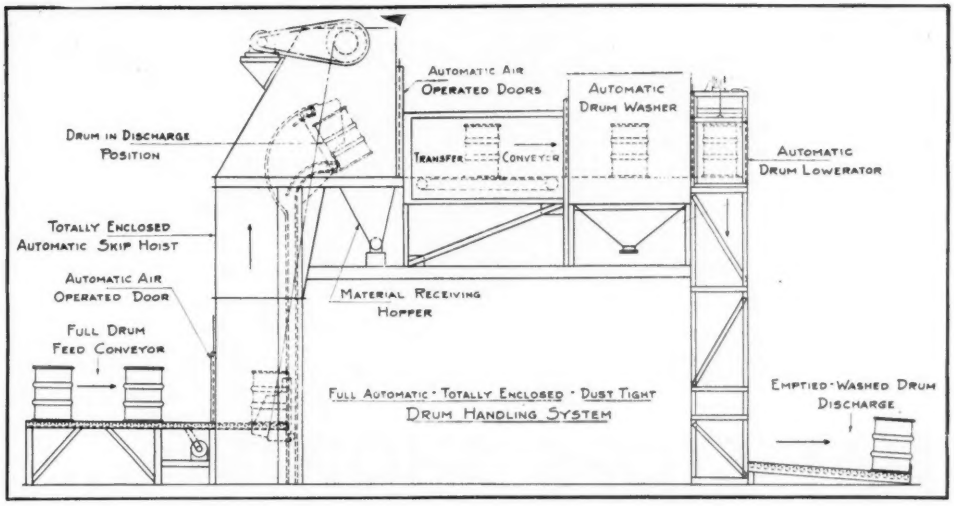
This machine can package a variety of liquids and semi-liquids in either transparent or opaque plastic film. It automatically fills the printed plastic film to form a pouch, then heat-seals the edges at speeds up to 120 bags per minute.

Positive displacement piston filling heads assure accuracy of fill. All parts in contact with product have sanitary fittings that are non-corrosive.

Other features include easy adjustment of fill without stopping machine and simple cleaning.—*Stokes & Smith Co., Frankford, Philadelphia 24.*

Circle 98D on Reader Service Card

Enclosed System Automatically Dumps, Washes Drums


Automatic Air Operated Doors
Automatic Drum Washer
Drum in Discharge Position
Transfer Conveyor
Automatic Drum Lowerator
Totally Enclosed Automatic Skip Hoist
Automatic Air Operated Door
Material Receiving Hopper
Full Drum Feed Conveyor
Full Automatic · Totally Enclosed · Dust Tight
Drum Handling System
Emptied · Washed Drum Discharge

Up to 40 drums per hour are handled by this conveyor system. Being automatic, it eliminates manual lifting. Also, work-hours are cut. And dust-free dumping and quick washing of the emptied drums are reported features.

The system is comprised of four principal units (see sketch): (1) a totally enclosed automatic skip hoist, (2) a transfer conveyor, (3) an automatic drum washer, and (4) a Lowerator.

In operation, a roller conveyor brings drums to skip-hoist enclosure, then an air operated door automatically opens and a drum is pushed in and onto an elevating carriage by an air operated pusher. As door closes, clamps on carriage grasp drum (30 or 50 gal.) and hoist elevates and upends it, emptying contents through a grating into a receiving hopper. Drum is then released from clamps and drops onto grating, which is electrically vibrated to dislodge any remaining material.

Air-operated exit door now opens, and a ram pushes drum onto transfer conveyor. Then exit door closes, and empty skip hoist carriage returns to loading position, whereupon entrance door opens again to receive next drum.

Transfer conveyor then moves first drum into automatic washer, where it is cleaned both inside and out, washed, rinsed, and blown dry. Automatic doors seal washer chamber during cleaning. From washer, drum travels to Lowerator and is moved to discharge conveyor.

Entire operation, from feed conveyor to discharge conveyor, is fully mechanical. Units are enclosed in dust-tight casing equipped with plate glass windows and sealed doors with glass panels.—*Gifford-Wood Co., Hudson, N. Y.*

Circle 99A on Reader Service Card

Flexible Tape Heats Below Glow Point

Small glass vessels of standard or odd shape, such as distilling or fractionating columns, can be heated with this flexible, wire tape designed to operate at black heat.

Chief advantage claimed is that tape produces high wattages without excessive heating of wire. Being well below the glow point, heat does not entail danger of fire in the presence of flammables. Unique construction utilizing a large amount of wire in a comparatively small area makes this possible.

Tape consists of resistance wire covered with a double insulating sheath of white, braided Fiberglas yarn, complete with lead wires for direct connection to 110v. current. Tape also can be made to operate on 220v. Constant temperatures may be maintained by a voltage regulator.

Tapes ½-in. wide are available in three standard lengths: 2, 4, and 6 ft. These are for 115w., 190w., and 275w., respectively (wattage varies with width and length). Other size tapes can be made to meet specific requirements.—*Scientific Glass Apparatus Co., Inc., Bloomfield, N. J.*

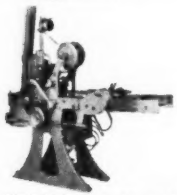
Circle 99B on Reader Service Card

IT'S MULTI-PACKING
in Cellophane . . .

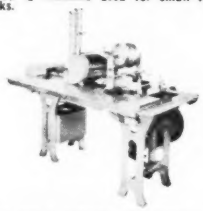
THAT STOPS SHOPPERS...

and it's SCANDIA
FOR FASTER, LOWER COST
MULTI-PACKS

Transparent cellophane wrappings or multiple packages get most sales out of least display space. They're the thing today. And the best way to multi-pack the widest variety of differently shaped packages is the Scandia way. There are Scandia semi-automatic and fully automatic machines that are multi-packing goods like the above at the rate of 100 a minute and think nothing of it. What's more—no cardboard base, 30% less cellophane, and no scorching or "cooking" of goods by heat-sealing! Space provides a long list of products now Scandia multi-packed, or of the line of Scandia Machines. If you want to increase sales through lower cost and better Multi-packing, just write Scandia today. This is a new field, so you better get expert advice from engineers who know!



#1 Model STS-3 High-Speed (200 p.m.) Cellophane Wrappnig Machine used for small Multiple-Packs.



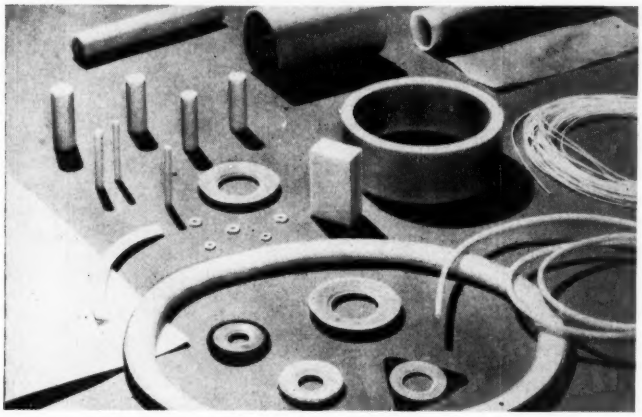
#2 Model SUS-6 Cellophane Wrapping Machine used for developing new Multiple-Packs (Avail-on rental basis).

#3 Model SFS-6 Medium Speed (100 p.m.) Cellophane Wrapping Machine used for larger Multiple-Packs.

SCANDIA MEANS MODERN *Multi-Packing*
Manufacturing Company
500 BELLEVILLE TURNPIKE,
NORTH ARLINGTON, N. J.

For more information, use post card on last page.

New Packings and Gaskets Have Unique Properties



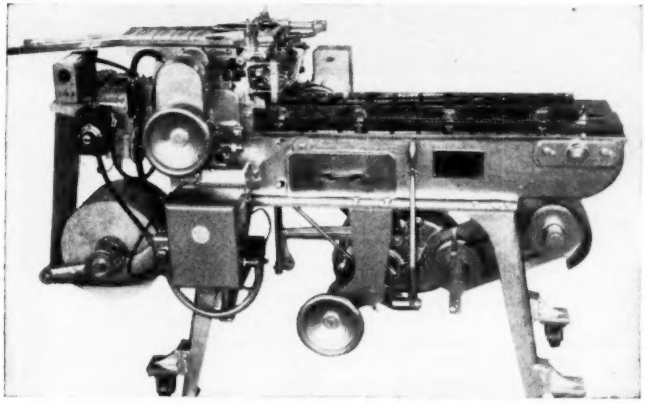
Announced is a complete line of Teflon gaskets and packing, as well as sheet, tape, cylinder, rod, tube, bar stock and special machined parts.

Packing is furnished lubricated or unlubricated in endless rings in continuous braided construction (braided types available with blue asbestos core). Gaskets are supplied in jacketed construction (choice of insert materials), or as solid Teflon ring gasket and special shapes.

Teflon, as a gasketing and packing material, is described as having the following properties: It is inert chemically, has high mechanical and impact strength, excellent dielectric properties, zero water absorption, and is serviceable from —150 deg. F. to 550 deg. F. In addition, this product has a naturally slippery, anti-sticking surface, one of its unique properties.—*Packing Div., Flexrock Co., 3609 Filbert St., Philadelphia.*

Circle 101A on Reader Service Card

Compact Unit Wraps Ice-Cream Sandwiches



New efficiency in packaging ice-cream sandwiches is reported achieved with this automatic wrapping machine.

Known as the Morpac Model ICS, the unit is compact, hence requires little floor space. And its bracket-and-caster mounting makes it portable. Machine is easily cleaned and sterilized. Electrical elements are quickly removed for steam cleaning.

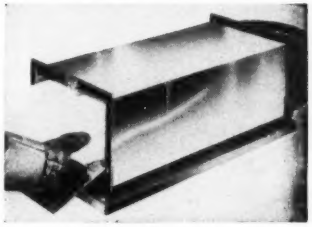
It is stated to meet sanitation requirements of State and Federal Health Departments. All gears are enclosed and run in oil. Metals contacting product are stainless steel.

Wrapper has variable speed drive with operating rate 30 to 120 packages per minute. Package dimensions are: Height ⅛ in.; width 2 in.; length 3¼ in. Approximate shipping weight is 1,200 lb.

Standard equipment includes "no product—no paper" feed, heat sealer, wrap register unit with electric eye control, and ½-hp. moisture-proof motor for either 220v., 3 phase, 60 cycle or 110v. single phase, 60 cycle. Package is bottom-sealed (die fold). Wrapper size: 8 in. web, 6¾ in. cutoff.—*Lynch Corp., Packing Machine Div., Toledo 1, Ohio.*

Circle 101B on Reader Service Card

Compact Dry-Ice Bunker For Smaller Trucks



Smaller delivery trucks can be economically refrigerated with use of this new, compact dry-ice bunker.

Known as the "Refrigerette", it measures 10-in. high, 13-in. wide, and 32-in. long. Unit is designed to use dry-ice blocks of ½-normal thickness, thereby considerably reducing height. Weight of bunker is approximately 30 lb.

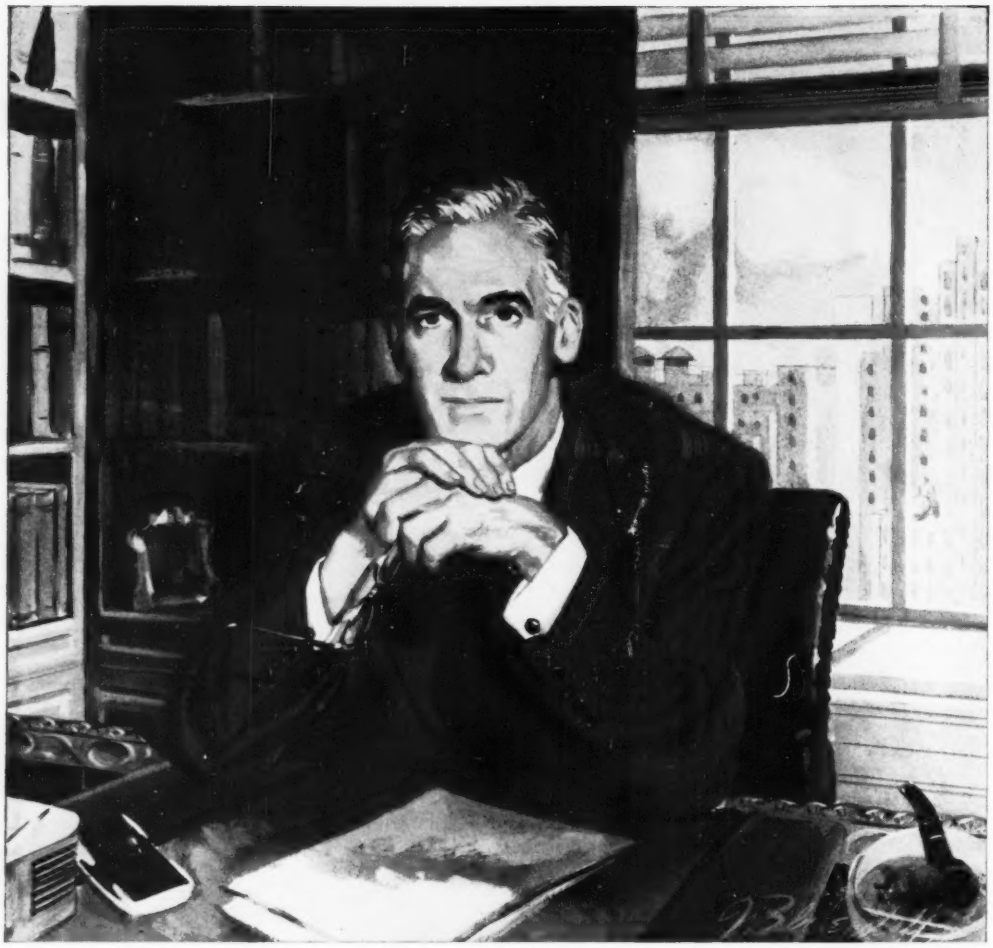
If desired, unit can be supplied with a sealed dry-ice compartment that provides outside venting of carbon dioxide gas.—*Foster-Built Bunkers, Inc., 757 W. Polk St., Chicago.*

Circle 101C on Reader Service Card

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard just inside the back cover. Then sign at the bottom and mail. No postage is needed.

For your convenience, too, all items in this department are listed and keyed in the Reader Service Section.



plenty of reason to set you dreaming

This is a time for planning, by business men of vision. The day must come when allocations and priorities will be words of the past . . . when materials will be much easier to get and orders perhaps much harder. Against that day, let some of your dreaming center on stainless steel, the most uniquely useful metal in the book—hard, strong, beautiful, everlasting.

● Our Development Engineers and Research Staff are at your service. Let us work with you. *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.*

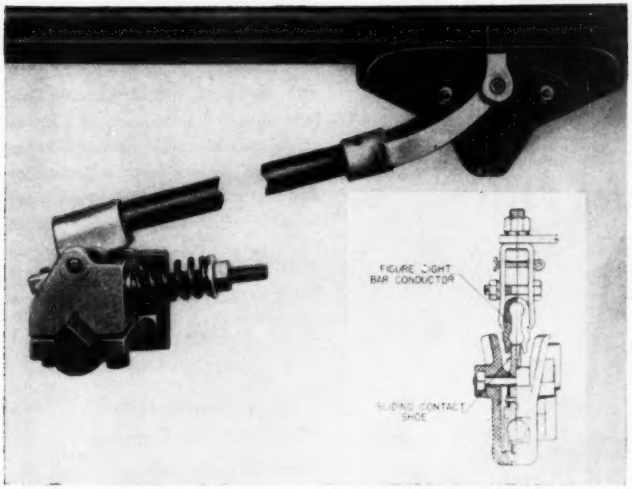
You can make it **BETTER** with

Allegheny Metal

AL
TIME-TESTED STAINLESS STEEL

W&D 4063

Safety Trolley System Easily Installed



Speed and simplicity of application are reported to minimize installation costs of a new trolley system designed to insulate bare figure-8-bar conductors for maximum safety. Maker states one man can insulate 100 ft. of conductor in but a few minutes.

Trade-marked "Insul-8-Bar," it can be applied to existing conductors without dismantling, or can be installed as a completely new system.

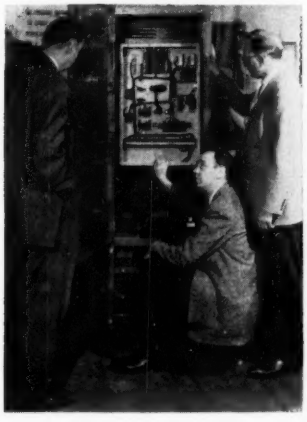
Basically, system consists of two units (1) A sheath of insulation material, readily cut to any desired length, that snaps over conductor; and (2) a sliding shoe collector, held against insulated conductor by spring action (adjustable from 2 to 10 lb. pressure). Sliding shoe makes contact with conductor through a continuous slit at bottom of insulation sheath.

System is adaptable to curves, switches, and crossovers.

Present system, rated to 60 amp., is designed specifically for standard, 1 in. figure-8-bar conductors. It is stated that larger and smaller amperage versions will be available in the near future.—*Benbow Manufacturing Co., 1285 Rollins Roads, Burlingame, Calif.*

Circle 103A on Reader Service Card

Minimized-Maintenance Speed Controller



Precise regulation of speed with no maintenance problems is reported with the new Regutron Magnetic amplifier control.

New unit is used with the adjustable-speed magnetic drive, an electromagnetic torque transmitting device that gives variable speed output when used in combination with a constant-speed motor.

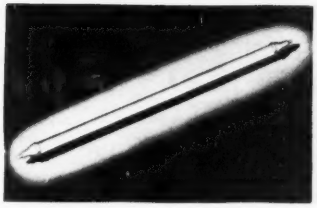
This simplified control is stated to eliminate complicated electronic circuits. A saturable core reactor amplifier system using non-moving parts accomplishes the stepless control of speed to within plus 0.5 percent. Sensitivity is obtained through a current amplification ratio of approximately 20,000 to 1.

Components are time-proven, states maker, and conservatively rated parts of the speed controller are designed for long life.

Drives are offered in ratings of 25 hp. and higher in the usual motor speeds. They are applied to loads such as fans, centrifugal pumps, and compressors.—*Electric Machinery Mfg. Co., Minneapolis 13.*

Circle 103B on Reader Service Card

Powerful Germ Lamp For Use in Ducts



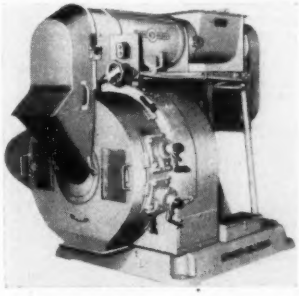
Here is a 1,200w. high-intensity ultra-violet germicidal lamp designed specifically for use in air ducts and areas where a large amount of killing power is desired.

Each lamp is termed equivalent in germicidal energy to approximately 15 or more of the conventional units.

New lamp enables use of proper intensities of germicidal energy necessary to achieve air sterilization in large duct installations.—*Cooper Hewitt Electric Co., Hoboken, N. J.*

Circle 103C on Reader Service Card

Makes Pellets A-Plenty



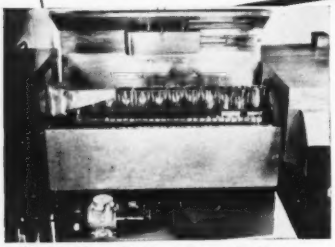
EASIER operation and maintenance, plus lower production costs, are reported for this pellet mill claimed to afford extremely high capacity. Mill is powered by 75-hp. 1,175 rpm. motor. Noise and vibration are minimized by V-belt drive.—*Sprout-Waldron & Co., Inc., Muncy, Pa.*

Circle 103D on Reader Service Card

Talk to a BARNES Process Engineer

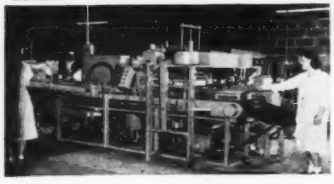
when you want to lower Food Packing Costs

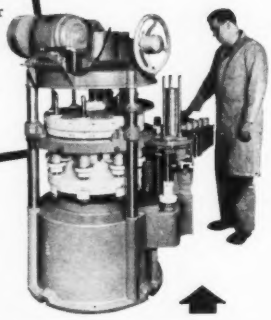
Here are three of many Barnes' installations that have proven profitable to food packers. As with other Barnes equipment, these represent the results of our work in collaboration with food packers on specific problems. If you have similar or other problems in your plant for which you haven't found equipment or, where available equipment is inadequate, call in a Barnes' process engineer. He may come up with the solution.



Valveless Straight Line Filler

This model 60 valveless straight line filler is one of the units used in the successful Martin Aseptic Canning System. It consists of a rectangular enclosure through which the cans are conveyed continuously in a straight line beneath a slit-type filling nozzle.





New, Fast, Efficient Double Seamer

This new closing machine features simplicity of adjustment, fast operation and identical seams. Moderate spindle speeds eliminate "bounce" over side seams and insure positive sealing. Write for additional data.

Unload 7 Cases Per Minute

This packer, faced with the problem of uncasing jars from cartons containing 36 jars for repacking into cases of 12, uses the above equipment to unload more than 7 cases per minute. Savings in labor and time are exceptional. If you have a similar problem we would be glad to furnish the packer's name upon request.

FREE ADDITIONAL DATA

on these and other time and money savers for the food packer will be sent upon request. Write today. Ask for Bulletin E-752.

W. F. and JOHN BARNES

PROCESS EQUIPMENT DIVISION 310 SOUTH WATER STREET, ROCKFORD, ILLINOIS

(ADVERTISEMENT)

Up to the Minute News On Aseptic Canning

Many canners are investigating the possibilities of putting up their products with the Martin Aseptic Canning System. Milk and milk products such as chocolate milk can be canned successfully with this new process. Vegetables and fruit products and juices are being canned commercially. The first product canned in this category was the famous Andersen's Split Pea Soup. This soup is being canned without losing flavor or color of the homemade style soup.

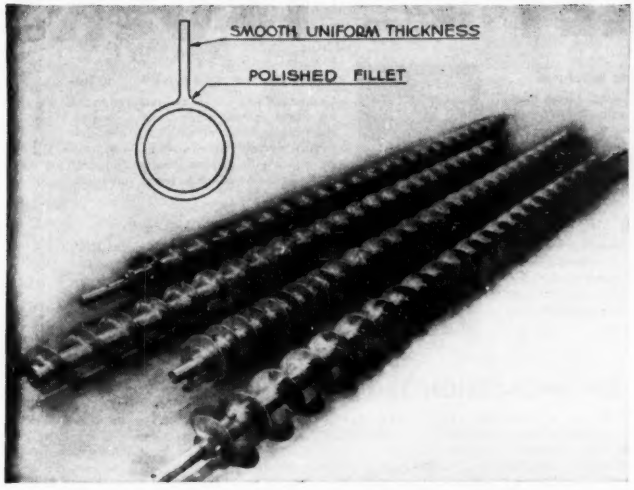
3 Large Dairies Install Pilot Lines for Canning Fresh Whole Milk

One of the most amazing results of this new process is canned whole fresh milk. Imagine what this means to milk starved areas such as Alaska alone. Also, think of the simplicity of distribution as compared with present day methods. Two large dairies are now canning fresh milk commercially and three more have installed pilot lines for milk and other milk products.

Banana Puree Soon To Be Available in Cans

Bananas have high nutritive value, they also are highly perishable. But, soon, the housewife and mother will be able to obtain banana puree for infant feeding and baking — out of cans. This, again, is a revolutionary canning job made possible and simplified with the Martin Aseptic Canning System. We at W. F. and John Barnes, as sales agents for this process, are glad to be able to bring it to the food packer. Call in a Barnes technician for further discussion. There is no obligation for this service. Write W. F. and John Barnes Company, Process Equipment Division, 301 South Water Street, Rockford, Illinois.

Screw Conveyors Are Crevice Free



In the design of this new line of screw conveyors, emphasis has been placed on sanitation.

New conveyor differs from normal screw in that joint between flight and pipe shaft is continuously welded to both sides of flight, and welds are ground to a smooth fillet and polished to a No. 4 finish.

Flights are of uniform thickness from pipe to outer edge. There are no lap joints or crevices to accumulate dirt. Screw has a smooth continuous surface from end to end.

Conveyors are offered in any standard or special size from 1 in. to 16 in. dia. in any pitch, thickness, and shaft dia. They are available in stainless steel, Monel, aluminum, or other metals. Deliveries are made in approximately three weeks if material is in stock.

These screws are available separately or in conjunction with complete systems that include hoppers, feeders, troughs, drives, spouts.—*Kornylak Engineering Corp., 513-521 Communipaw Ave., Jersey City 4, N. J.*

Circle 105A on Reader Service Card

New Milk Can Pours Faster, Cleans Easier

Quicker pouring and improved sanitation are benefits cited for this new streamlined milk can.

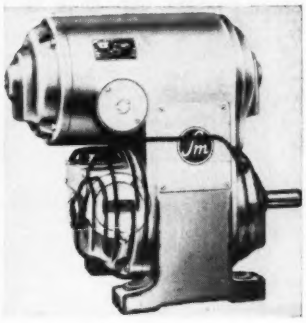
Approach to neck is a smooth wide arc beginning at middle of can, designed to eliminate any catch basin and to allow milk to flow faster and completely out of can. Speedier pouring means less milk will stay on sides.

All points inside can are fully visible, and are thus easier to inspect and simpler to clean. Can is reported more readily washed by mechanical units.

Another feature aimed at better sanitation is the can's narrower pouring lip which reduces dust catching. Overall dimensions and weight are same in new style as in present cans. This makes it possible to use two together. Tin steel, same material used in present cans, is being employed in new.—*Solar-Sturges Mfg. Div., Pressed Steel Car Co., Melrose Park, Ill.*

Circle 105B on Reader Service Card

Vari-Speed Drive Fits Standard Motor Base



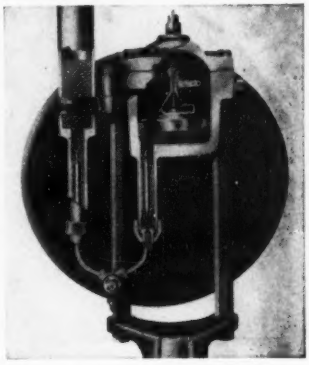
This variable speed drive is dimensioned for same mounting as NEMA standard motor (see photo). It consists of a transmission with positively adjusted pulleys and an induction motor built in a single, compact unit.

The design aimed to save the cost of building special bases where interchangeability between variable speed and standard motors is required.

Drives are available single phase in sizes from 1 to 3 hp. and polyphase in sizes from 1 to 15 hp. with 2-1, 3-1, or 4-1 speed variation. They may be obtained in drip-proof, splash-proof, and totally enclosed designs.—*Sterling Electric Motors, Inc., 5401 Anaheim-Telegraph Rd, Los Angeles.*

Circle 105C on Reader Service Card

Accurate Flow Meter Is Easy to Maintain



Five basic improvements in design are reported to provide higher sustained accuracy and easier maintenance in this new flow meter.

Noted first (see cutaway view above) is the pressure-seal bearing,

Go by these plain, hard Facts . . . and SAVE!

CHEVROLET Advance-Design TRUCKS

Fact No. 1

Saves you money on purchase

Check the price on a Chevrolet truck that's the right size, type and capacity to handle your work. You're going to find that this Chevrolet truck lists for less than any other make of truck capable of doing the job. Here's an immediate, cash saving.

Fact No. 2

Cuts operating costs

Day in, day out a Chevrolet truck works for rock-bottom "wages" on fuel and upkeep. It brings you the proved economy of Valve-in-Head engine, with 4-Way Lubrication to reduce engine wear. Extra-rugged features cut maintenance costs.

Fact No. 3

Gives you the right truck for the job

Chevrolet trucks are factory-matched to the job—tires, axles, frame, springs, engine, transmission, brakes. It's the Chevrolet idea to provide you with exactly as much truck as you need and no more. Chevrolet truck users know this idea pays off.

Fact No. 4

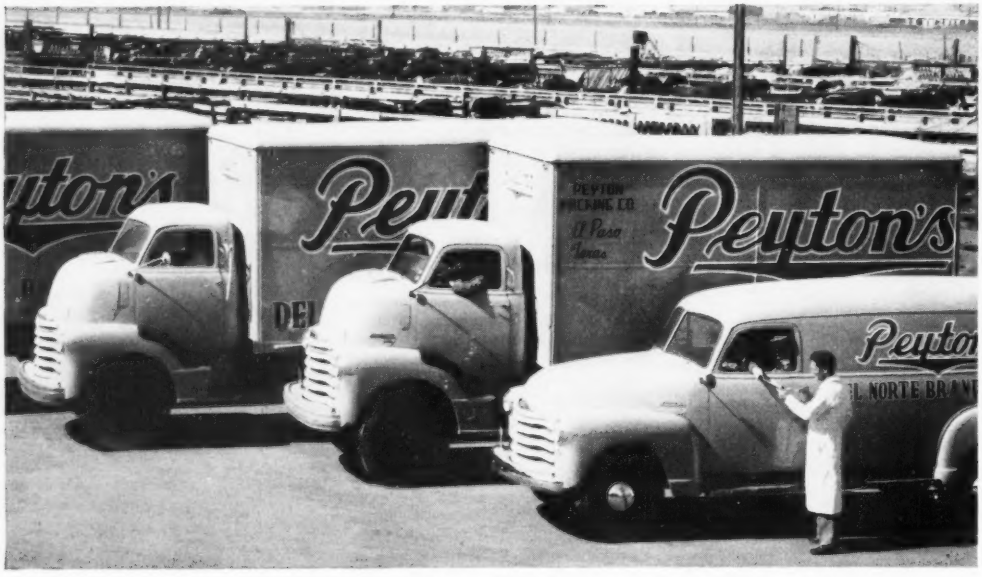
Saves money on trade-in

It's right in the records that Chevrolet trucks traditionally bring more money on the used truck market—and that can mean more money for you when you trade or sell. There's another reason why more truck users choose Chevrolet than any other make.

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load • POWER-JET CARBURETOR—for smooth, quick acceleration response • DIAPHRAGM SPRING CLUTCH—for easy-action engagement • SYNCHRO-MESH TRANSMISSION—for fast, smooth shifting • HYPOID REAR AXLE—for dependability and long life • TORQUE-ACTION BRAKES—on light-duty models • PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES—on medium-duty models • TWIN-ACTION REAR BRAKES—on heavy-duty models • DUAL-SHOE PARKING BRAKE—for greater holding ability on heavy-duty models • CAB SEAT—with double-deck springs for complete riding comfort • VENTI-PANES—for improved cab ventilation • WIDE-BASE WHEELS—for increased tire mileage • BALL-TYPE STEERING—for easier handling • UNIT-DESIGNED BODIES—for greater load protection • ADVANCE-DESIGN STYLING—for increased comfort and modern appearance.

CHEVROLET DIVISION OF GENERAL MOTORS, DETROIT 2, MICHIGAN



CHEVROLET first in demand in value in sales

lubricated at factory to eliminate periodic lube maintenance. Leak-proof at working pressures, the bearing uses no springs and needs no mechanical adjustments. Bearing body and its associated parts are interchangeable.

Also interchangeable are the plastic check floats, which are kept clean by complete submersion in mercury. A new stainless steel ball-plug and seat is designed to prevent clogging and locking.

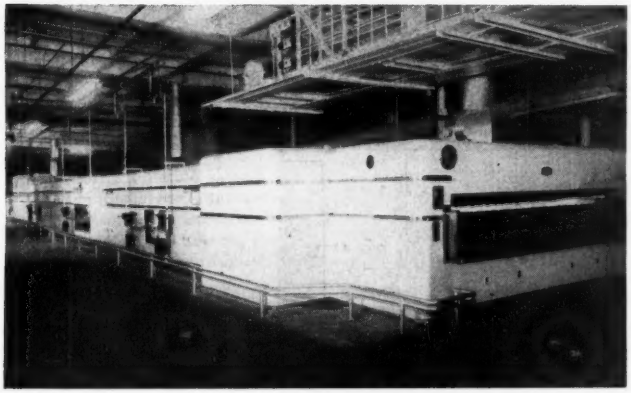
Improved U-bend has metal-to-metal compression seals, tested at 10,000 psi. for protection against mercury loss. New, replaceable seats are made of hardened stainless steel. There are no gaskets to replace.

New damping plug is calibrated to simplify adjustments. With the plug set at drain position, the drain port (located at the low point in the U-bend) allows mercury to be completely emptied without any loss or spillage.

Finally, a new type of stainless steel ball-chain, by which the straight-line motion of the float is transmitted to the recording pen assembly, is incorporated to eliminate friction and errors of angularity.—*The Foxboro Co., Foxboro, Mass.*

Circle 105D on Reader Service Card

Flow-Heat Used in Tunnel Baking Oven



An entirely new "motion" heating system is employed in this tunnel type bread baking oven.

Called the Thermoflow, the system is stated to surround each loaf with an even temperature for quick and thorough baking.

Heat is blown through the grill hearth and around each loaf from the bottom of the oven. Then drawn through slots in the ceiling, it is returned to the bottom of the oven and recirculated through the baking chamber. Maker states heat penetrates product rapidly, baking soft, moist, thin-crust loaves with an evenly distributed color.

Baking flexibility is obtained through zoned construction. This permits maintenance of any desired temperature in each zone. Also, any zone temperature can be raised or lowered quickly.

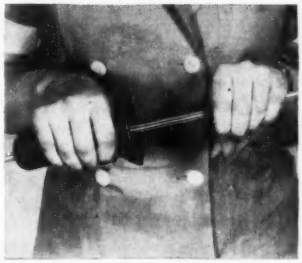
For baking steamed hearth products, the first baking zone can be readily changed from a blowing to a non-turbulent baking atmosphere. This atmosphere, plus low velocity steam from an ejector, is stated to provide excellent steaming effects for all types of bread.

Oven is built with a raised grill hearth so that pans can be stripped from it gently and evenly. Oven is equipped with an automatic loader which can be fed either by hand or by conveyor bringing pans from final proofer or rack unloader.

A broad depanner can be built into the discharge end of the oven to dump a complete row of pans at one time, then deliver the bread into a cooler and empty pans into a pan-return, motor-driven, conveying system.—*Read Standard Corp., Bakery-Chemical Div., York, Pa.*

Circle 107A on Reader Service Card

Tubing Handled Safely With New Grip Device



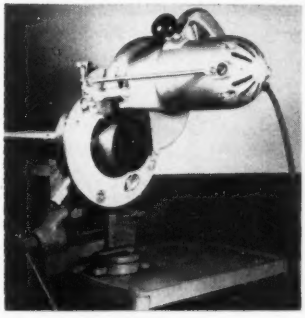
This new Grip-Safe device is offered for protection in the handling of glass tubing.

Inserting of glass tubes and thermometers in stoppers has always been a frequent cause of accidents in the laboratory. New holder, made of Neoprene, eliminates this hazard by providing a gentle, but firm gripping action which permits sliding tubing into stoppers without the excessive or uneven pressure that often breaks it. And if tubing does break, holder protects hands, wrists, and knuckles from cuts.

It accommodates most sizes of commonly used tubing. Irregular shaped tubing, such as T's and L's, can also be handled. Also, it can be used to safely break tubing to desired length after marking with file or cutter.—*Labline, Inc., 4710 W. North Ave., Chicago 39.*

Circle 107B on Reader Service Card

Saw Cuts Tubing Fast, Leaves Smooth Ends



Designed for quick, accurate cutting of pipe and tubing of aluminum, copper, and stainless steel, this new "Super Speed" power cut-off saw uses standard 110v. a.c. current and is termed simple to operate.

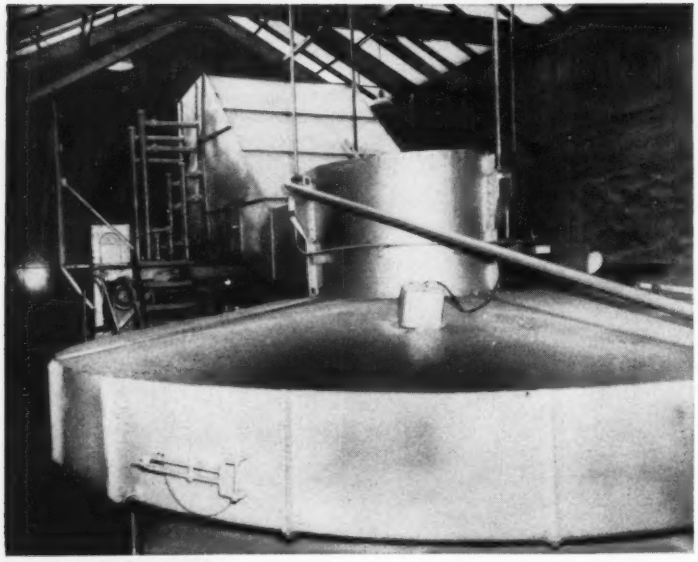
A heavy-duty, abrasive disk does the

ALL but 2% of Moisture Extracted

from Various Milk Products

by AUTOMATICALLY-CONTROLLED GAS DRYER

at DEAN MILK COMPANY



20' diameter stainless steel dryer for powdered milk production, with Gas-fired Air Heater in the background. In the round portion is located the nozzle from which fluid milk is sprayed into the hot air stream under high pressure.

POWDERED MILK another of the long list of important food products processed in Gas-fired Equipment, requires precise control of temperature and volume of heated air to dehydrate fluid milk. In a pilot plant, which also utilized GAS for heat processing, Dean Milk Company engineers developed the method of atomizing milk at high-pressure into a turbulent stream of heated air.

The success of the pilot plant guided these engineers in the construction of a Gas-fired Extractor which delivers powdered milk, ready for packaging, with 2% or less residual moisture.

Because powdered milk must meet the same sanitation standards which health authorities have set up for fluid milk Dean Milk Company observes the strictest standards of quality control and cleanliness. The use of GAS, with its precise controllability and inherent cleanliness, aids in both of these—and in reducing the complexity and costliness of equipment, as well.

The scope of GAS applications for food processing is so broad that you will find it worthwhile to examine your present and future needs for fuel in any types of operation—ask your Gas Company Representative for assistance.

AMERICAN GAS ASSOCIATION • 420 LEXINGTON AVE., NEW YORK 17, N. Y.

cutting. It is stated to slice through metal rapidly, leaving smooth, square, non-distorted ends.

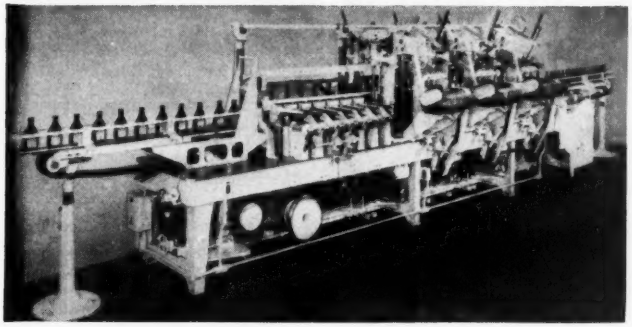
Saw is attached to free-moving, rotating frame which encompasses the piece to be cut. Thus, saw and frame rotate together. Set to make desired cut, unit then rotates 360 deg., cutting around the periphery of tube or pipe until job is complete.

This tool secures to any bench or vise, says maker, and is quickly adjusted to size of tube or pipe. And being light in weight, it is portable.

Operation is at high speed, with cuts through 2½-in. 15 gage stainless tubing made in 30 sec. Sturdy construction includes safety features.—*Tri-Clover Machine Co., Kenosha, Wis.*

Circle 107C on Reader Service Card

Unit Labels Containers at 150-Per-Min. Rate



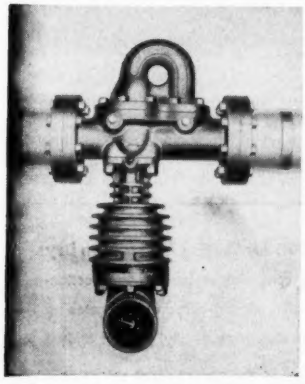
High speed of label application is a feature of the new Model 150 World "Bee-Line" machine.

Equipped with three labeling stations, unit handles three containers simultaneously. It delivers 150 labeled containers per minute. Labels are applied with precision to the body, front and back, neck or shoulder to round, square, oval, flat, or paneled containers.

All electric control assures smooth, gentle handling of containers and easy convenient pushbutton operation. Straight line flow minimizes collisions or traffic jams.—*Economic Machinery Co., Worcester, Mass., Div. of Geo. J. Meyer Mfg. Co., Milwaukee.*

Circle 109A on Reader Service Card

Improvements Mark Redesigned Meter



Four improvements are claimed for this redesigned Model SMKS Shuntflo Meter, used for steam, air, or gas. They are as follows:

1. New, streamline damping chamber to facilitate a uniform cooling system.
2. All-Meehanite body casting for greater strength and durability.
3. A simplified rotor mechanism designed for greater efficiency of operation, easier replacement of parts, and longer service.
4. A strengthened rotor shaft for withstanding slugs of undue condensate in the line or sudden fluctuations in line pressure.—*Builders Providence, Inc., Providence, R. I.*

Circle 109B on Reader Service Card

Bottle-Rail Width Simply Adjusted

Critical adjustment of bottle-rail width on this conveyor is made from a single station.

Using a warm gear control, manually operated from one point (circled in illustration), rail width spacing is adjusted within the conveyor's range of 5½ to 2¼ in. (2-qt. to ½ pt.). Employment of telescoping stainless-steel rails maintains a constant width on curve and straight sections for the entire length of conveyor layout.

Maker states adjustment takes only a few seconds and eliminates former expenditure of time in spacing straight and curve sections one by one.—*Conveyor Specialties Co.,666 E. Third St., St. Paul 6, Minn.*

Circle 109C on Reader Service Card

Viscometer Accurate Over Wide Range

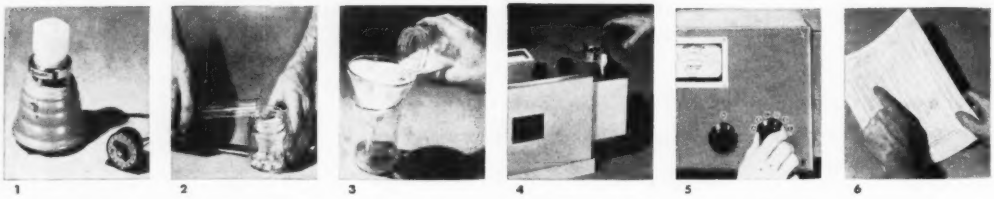
This new Model LVT viscometer, with its eight speeds starting at .3 rpm., is described as of special value where wide ranges of viscosities are encountered.

When equipped with a UL adapter

Every Major Corn Packer in Wisconsin Tests Maturity with a SEEDBURO STEINLITE 300 Moisture Tester!

...THEY WERE ALL ABLE TO INCREASE UNIFORMITY AND QUALITY OF PACK. YOU CAN, TOO.

EASY TO USE



1. **Pulverize sample in blender**
2. **Blend 100 c.c. solvent with weighed portion of sample**
3. **Filter**
4. **Pour filtrate into test cell**
5. **Rotate dial and read meter. Temperature registers automatically**
6. **Convert meter reading directly to moisture content on chart, making adjustment for temperature**

Takes only 5 minutes. The test can be easily made by inexperienced personnel. Once the moisture is known maturity and quality can be predicted. Many of the Wisconsin Canners cooperate with others in their area. They compare estimates of moisture content for maximum sweetness, tenderness, juiciness for each season.

●

Packers Use Steinlite 300 for Other Vegetable and Meat Products. Lima beans, peas, asparagus, pumpkin, squash and other vegetables are now being harvested for top quality pack using the Steinlite. Baby food manufacturers use the 300 LCS. Otoe Food Products Company uses the Steinlite to insure meeting rigid government specifications on G.I. Rations. Used by frozen food packers as well as canners.

ONLY $475.

IF YOU PACK CORN YOU NEED A STEINLITE

The fastest, surest, lowest cost way to improve uniformity and quality of pack. Increase your profits this year with more EXTRA FANCY corn selected by testing moisture with a Steinlite 300.

IF YOU CAN OR FREEZE OTHER VEGETABLE OR MEAT PRODUCTS LEARN ABOUT THE STEINLITE

Now the 300 LSC can help you control uniformity, increase yield and improve quality of your pack.

REPRINTS AVAILABLE Articles describing the use of the Moisture Testing for corn and other products will be sent on request. Ask for

- ☐ Here's a 5-minute tester for Sweet Corn Moisture Content.—Food Processing
- ☐ Tri-Metric Test Predicts Corn Quality.—Food Engineering
- ☐ A comparison of 3 Methods for Moisture Determination in Sweet Corn.—Food Technology
- ☐ Blue Lake Packers Use Latest Methods on Corn.—Western Canner & Packer
- ☐ Rapid Moisture Analysis Gives Results in Time to Use Them.—Food Processing and National Provisioner

Write today for complete facts. No obligation, of course.

SEEDBURO EQUIPMENT COMPANY

734 Converse Building • Chicago 6, Ill.

SEEDBURO the Hi-Master Line

Use the Steinlite 400G for Testing Moisture in Dry Products. Tests grain, corn, rice, soybeans, beans, cottonseed, flour, coffee, molding starch, dehydrated vegetables, eggs, etc. in 60 seconds. Determine quality, protects against spoilage, protect yield.

(an accessory designed to provide amplifying effects), unit is stated to be capable of accurately measuring any viscosity between .5 cps. and 2,000.-000 cps.

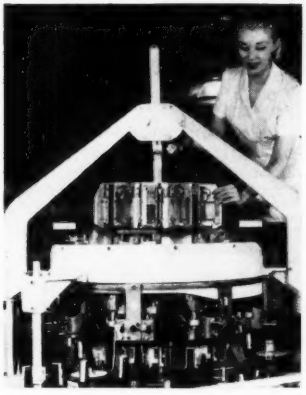
Portable, and thus easily used either in lab or plant, instrument features a new bubble level permanently attached for setting up either in a laboratory stand or when making point-of-process determinations.

As shown in illustration, viscometer is accompanied by set of suitable spindles and a holder. A compact carrying case is included.

Determinations are secured directly in centipoises by inserting instrument's spindle in material to be measured, flicking on a switch, and reading the dial. Whole operation, including cleaning up, is stated to take only a minute or two.—*Brookfield Engineering Laboratories, Inc., Porter St., Stoughton, Mass.*

Circle 109D on Reader Service Card

Automatic Unit Applies Bands to Bottle Necks



Cellulose bands are automatically applied to bottle necks by this new AMF Automatic Bander.

A continuously operating turret-type machine, it can apply wet cellulose bands at from 50 to 140 bottles a minute. Rate is governed by speed of bottling plant's production line.

Employing mechanical and vacuum principles, bander is capable of handling round, flat, or square bottles. One operator is required to keep unit's eight station hoppers constantly supplied with seals.

Cellulose band discourages tampering with bottle and protects tax stamp where one is required. Since Federal law directs that tax stamp number be visible, seal may be manufactured with side windows or completely transparent. Trade names may also be printed on it.

Unit is capable of handling bands up to 70 mm. long. It is adjustable to height for any size bottle from ½ pt. to 1 qt.—*American Machine & Foundry Co., 511 Fifth Ave., New York City 7.*

Circle 111A on Reader Service Card

Canvas Pallet Binder Simplifies Handling

Greater convenience and safety in shipping of fragile and bagged commodities are provided with use of this canvas pallet binder.

It is reported to function with any size pallet or skid, adapting to varying heights and shapes of loads. Maker says that average workmen can apply and secure the load within five minutes without tools. Binder can be used over and over again, since nothing is scrapped.

Also, binder can be readily removed for rapair on inspection of cargo, then quickly retightened. Stacking is possible without damage to cargo or wrapper. Upon arrival at destination, it can be removed for re-use, and the cargo, still on the pallet, placed in storage or production.

Damage to individual items is reduced, since all are secured and protected by canvas proper as well as webbing and steel cables that have shock absorbing flexibility.

Further, bound loads provide greater safety for workmen by eliminating hazardous rehandling of individual pieces and danger of their falling from pallets.—*Roger L. Toffolon, Brandywine Ave. and Wylie St., Schenectady, N. Y.*

Circle 111B on Reader Service Card

Sanitary Metal Milk Case Holds 1 & 2-Qt. Bottles

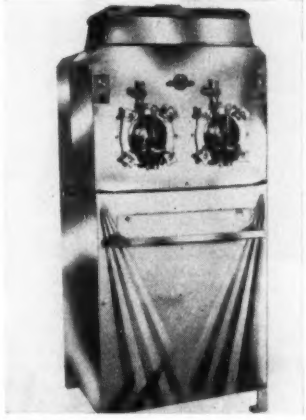
Newly introduced is this paper-bottle case designed to hold 16 1-qt. or 9 2-qt. containers—the latter a size that milk dealers are finding in increasing demand.

New metal case is zinc dipped for greater sanitation and ease of cleaning. Extra large hand grips on all four sides permit handling of case from any angle.

All joints are welded for greater rigidity, with elimination of seams and crevices. Stacking irons are not needed because of specially designed retaining walls on bottom of case.—*United Steel & Wire Co., Dairy Div., Battle Creek, Mich.*

Circle 111C on Reader Service Card

Soft Ice Cream Unit Has Two Freezers



This new Double 5P soft ice cream machine is a twin-head unit that incorporates two independently operat-

HOLD pH VALUE AUTOMATICALLY

Hundreds of food plants use Bristol Automatic pH Controllers and Recorders to hold pH at the value known to produce the best results.

In many processes pH has a marked effect on the product. When automatically controlled, time, money and materials are saved, and a more uniform quality product results.

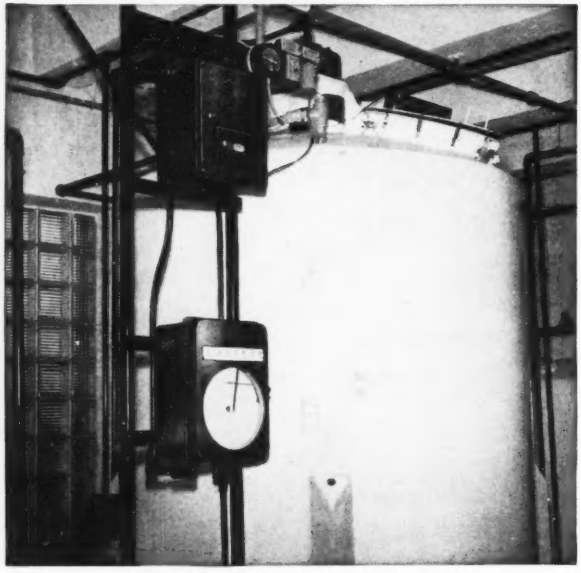
In plant water treatment, for example, the control of pH at very definite values is almost an absolute necessity for proper operation of coagulation, neutralization, softening, and ion exchange processes.

In sugar refining, automatic regulation of liming of raw cane juice maintains pH at the value that produces proper clarification.

In manufacturing gelatine, pH must be carefully controlled to obtain a product with the desired solubility, viscosity, clarity, and jelly strength.

Control of pH is also an important factor in efficient neutralization of excess acidity or alkalinity of waste before disposal.

Write for bulletins covering pH instruments and the other Bristol Food Plant Instruments listed to the right. THE BRISTOL COMPANY, 115 Bristol Road, Waterbury 20, Conn.



Typical installation of Bristol pH Instruments

FROM COAST TO COAST MANUFACTURERS OF

Bakery Products
Beverages
Canned and Preserved Products
Cereals
Coffee
Confectionery
Corn, Potato, and Root Starch Products
Dairy and Milk Products
Edible Oils
Flavoring Extracts, Food Colors, etc.
Gelatine
Grain Products
Meat Packers
Sugar
Syrup and Molasses
Vinegar and Cider
Vitamins
Yeast

USE THESE BRISTOL INSTRUMENTS

Automatic Control Instruments — including electric, pneumatic, and time-program controllers,
Recording Instruments, and
Telemetering Instruments

TO MEASURE AND CONTROL

Absolute Pressure
Current
Draft
Flow of Fluids in Pipes
Humidity
Liquid and Water Level Recorders
Mechanical Operation and Motion
pH Value
Power
Pressure
Running and Down Time and Running Count
Speed of Travel and Rotation
Temperature (including thermometers, pyrometers, and potentiometers)
Time in Process
Vacuum
Voltage

FOR BETTER QUALITY AND LOWER COSTS IN

Air Conditioning
Baking
Blanching for Canning
Cooking and Boiling
Drying
Electric Equipment and Plant Distribution Systems
Evaporating, Condensing, Distilling
Fermenting
Flow of Liquids, Solutions, Steam, and Gases
Heat Exchanging
Heating, Cooling
Mixing, Kneading, Blending, Emulsifying, Homogenizing
Pasteurizing
Plant Waste Disposal
Product and Materials Handling
Refrigeration
Roasting
Steam Generation and Distribution
Sterilizing
Water Supply

THE DEPENDABLE GUIDEPOST OF INDUSTRY

BRISTOL

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

ing freezers. It has a capacity of 5 gal. of ice cream, custard, or sherbet per hour for each head.

Machine has a refrigerated hopper, trigger-action no-drip head, and a new automatic valve. It is reported that the refrigerated hopper keeps the temperature of mix down, thus making freezer work faster and easier. Automatic valve returns a portion of mix to cylinder for every portion dispensed.

Other features: Continuous freezing, direct dispensing, construction of stainless steel, and design for easy cleaning. The twin unit is 27 in. wide, 23 in. deep, and 50 in. high. It incorporates two 1-hp. compressors. — *Port Morris Machine & Tool Works, 712 E. 135th St., New York City.*

Circle 111D on Reader Service Card

New Chemicals

Heavy Duty Cleaner For Valves, Fittings

Effective, economical cleaning of valves and fittings is reported with use of a new heavy duty alkaline cleaner.

Known as Magnus 61RS, it has a strong alkaline cleaning action, but without fumes, and is stated to be free from the hazards of caustics. Valves and fittings are loaded into an 800-gal. heated tank containing an 8-oz.-per-gal. solution of 61RS in water. This solution is kept at a rolling boil.

Some fittings are reported thoroughly clean in 30 min. They are removed and processed. Others may take longer, but with certain exceptions, 1 hr. is enough for most valves and fittings.

On valves and fittings having a scale condition, or where it is known that an acid treatment is necessary to dissolve deposits, another product, D-Scale-R, is used. This is an inhibited acid cleaner in which the parts are soaked to remove the deposit.

Procedure is to give such parts the regular alkaline cleaning treatment, then to clean with the D-Scale-R solution at 8-oz.-per-gal. of water heated to 130 deg. F. for about 30 min., or until deposit is dissolved. Parts are then water rinsed and given a brief dip in the regular 61RS solution, to neutralize any residual acid, and finally rinsed with water.

Valves and fittings with carbonized oil deposits are first treated with No. 751, a carbonized oil solvent. This cleaner is used straight at room temperature. It is stated to quickly penetrate into the carbon deposits and loosen their bond to the metal for removal by the regular 61RS. Treatment consists of a 15-min. soak in 751, after which the work is ready for charging into the regular cleaning tank without rinsing. No harmful action on steel, stainless steel, cast iron, brass, or bronze is reported with use of these cleaners—*Magnus Chemical Co., Inc., South Ave., Garwood, N. J.*

Circle 113A on Reader Service Card

Antiseptic Creams Combat Irritants

Irritations from free acids or alkalis in industrial operations are minimized with use of a new line of antiseptic protective creams.

Containing hexachlorophene, these products provide a "zone of inhibitation" against Staphylococcus aureus and are so formulated as to be almost neutral in pH.

Creams are packed in 12 oz. tubes for easy, sanitary handling. They are: No. 211, oil resistant, water soluble, vanishing—versus dust-borne irritants, viscous oils, dirts, greases, and grimes; No. 311, water-resistant—versus dilute acids and alkalis; and No. 411, a solvent-resistant water soluble, vanishing—versus organic solvents, acetates, and cutting oils of low water content.

For economical use of creams, maker has designed a polystyrene dispenser that discharges a pre-determined amount with each stroke of lever. Unit (see photo) contains an inner collapsible polyethylene bag that protects cream against contamination from dirts, dusts, and soils. No working part comes in contact with cream. —*West Disinfecting Co., 42-16 West St., Long Island City 1, N. Y.*

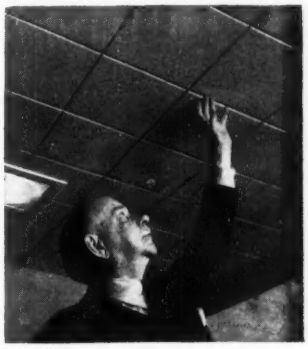
Circle 113B on Reader Service Card

Powdered Ingredient For All Type Icings

Practo-Ice is the name of a new composite powdered basic ingredient used for making all types of icings.

Packed in 50- and 100-lb. multiwall paper bags, new ingredient is termed easy to weigh, mix, and spread. Stated to be fast-setting and non-peeling, it is termed resistant to high temperatures and humidities. Trial samples are available from maker upon request.—*The Nulomoline Div., American Molasses Co., 120 Wall St., New York City 5.*

Circle 113C on Reader Service Card



Acoustic Tile Facing Is Easy to Clean

For use in any ceiling area where frequent cleaning is necessary, this non-combustible acoustical product features a new plastic film facing. Known as Sonofaced tile, it is stated to reduce sound by diaphragmatic action.

The film facing serves as a drumhead, transmitting sound by vibration into the Fiberglas board, which cuts down noise by trapping the sound waves in the cells formed by the intertwining fibers.

Sonofaced ceilings are stated simple to clean and are firesafe. They have good light-reflection qualities and high acoustical and thermal values.

Tile used for scribing to walls and for fitting around ceiling obstructions has the film cemented on the edges and across its face. This allows applicators to cut it without wrinkling plastic facing. Tile which needs no cutting has film stretched taut across face and cemented on edges only.—*Owens-Corning Fiberglas Corp., Toledo 1.*

Circle 113D on Reader Service Card

In Behalf of Progress . . .

Bureaucrats Block Aid on Food for Military

Progress in the solution of important military food problems has been snafued by the Department of Justice. And this has been done under the guise of protecting the country against big business.

Using the anti-trust laws as an excuse, the power-hungry, socialistic-minded, legal bureaucrats cunningly devised the Standing Operating Procedure for government agencies, including the Quartermaster Corps. This S.O.P. (some change the last letter) governs in great detail the formulation, utilization, and operation of industrial advisory committees established to assist the QMC unselfishly and without reward.

It would take pages to list all of the ridiculous provisions and restrictions of this red-tape document. But here are a few:

A committee meeting must be called by the government—not by committee officials who know what needs to be done, and when.

The agenda for a meeting must be approved in advance—yet committee activities call for handling of problems as they come up during a session.

The meeting must be held on government property—but technical know-how and facilities often are concentrated in an area far from a suitable government meeting place.

The meeting must be presided over by a government official. It is his responsibility—assisted by a young, inexperienced government lawyer—to limit the discussion, not to encourage maximum results.

A verbatim transcript of the proceedings must be made for the government—thereby eliminating free technical discussion.

No paid employees of trade associations shall be on an advisory committee—although some of the best technical brains work for trade associations.

Committee membership must be proportioned among companies of various sizes and according to geographic distribution—and never mind the fact that the majority of top technologists are with larger companies. Nor that geographic distribution would result in committees too large to be effective.

Not only do these provisions in themselves hog-tie committee activities, but they introduce so much time-consuming procedural red tape that committee members can do little constructive work. In fact, many are inclined to give up in frustration and go about the industrial jobs for which they are paid.

S.O.P. already has cost the country the benefits of a year's normal achievements by the key Activities Committee of Research & Development Associates, Food & Container Institute. It forced that committee to suspend activities for many months because effective operation was impossible.

In a test operation—a task group meeting on dehydrated fruits and vegetables—at least as much time was spent in arguing the mechanics of the meeting as was devoted to discussion of the important problems under consideration.

Many sincere attempts have been made to obtain workable modification of S.O.P., but to no avail.

So the Activities Committee questions the sense of remaining in existence—although it recently decided to give S.O.P. another try. And why shouldn't it feel that way? Its patron, Food & Container Institute, cannot ask for help except in broad, general terms. And the industry cannot offer help except on an individual and voluntary basis.

To say that this is unfortunate is the understatement of the year. The need for industry's assistance in solving the multitude of military food and packaging problems has been spelled out in great detail.

Here you have an absurd spectacle. The military cries for help. The food industry is more than willing to give it—on its own time and at considerable expense. But Washington bureaucrats throw up a silly red-tape road block.

Merely on a financial basis, taxpayers and their representatives in Congress ought to be seriously disturbed. The food industry gives a lot of free service to the government. Its expenditure for food research and development pertaining to military problems is estimated at $50 million a year. This compares with a $1.6-million 1952 military budget for this type of research.

It is obvious that the Department of Justice is killing a goose that lays golden eggs. If all industries contributed as much free research as does the food field, total military research expenditures would be greatly reduced.

Serious as is the hamstringing of advisory committees, there is an even worse implication in S.O.P. It lies in the ulterior motives of the Department of Justice. The declared intent makes no sense. The anti-trust laws are directed against management-engineered monopolistic practices. By what stretch of the imagination can they be applied to the unselfish, patriotic service of diversified groups of sincere, high-caliber, technical men?

One comes, then, to a disturbing conclusion. The real motive behind S.O.P. is the bureaucratic zeal of this Administration to control industry activities. It is significant that the Assistant Attorney General who handled the steel case for the government is a former head of the anti-trust division of the Department of Justice. He is the one who attributed unlimited power to the President—and the devil with the courts, the Congress, and the Constitution.

So we better work and pray for a decision at the polls to rid Washington of S.O.P. officiousness.

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WIDE APPLICATION

FOOD PRODUCTS	FUNCTION OF VOTATOR APPARATUS
Cream Style Corn	Sterilizing and Cooling
Dog Food	Cooking, Sterilizing and Cooling
Chocolate Milk Drink	Sterilizing and Cooling
Edible Starch (For Salad Dressing)	Cooking and Cooling
Pie Filling	Cooking, Pasteurizing and Cooling
Strained Food	Sterilizing and Cooling
Soup	Sterilizing and Cooling
Lard	Chilling and Plasticizing
Margarine	Continuous Manufacture
Shortening	Chilling and Plasticizing
Sweetened Condensed Milk	Cooling and Crystallizing of Sugars
Invert Syrup	Cooling and Crystallizing of Sugars
Eggs	Pasteurizing and/or Chilling
Concentrates, Fruit Juices and Purees	Slush-Freezing
Juice Concentrates	Enzyme Inactivation, Sterilization, Cooling

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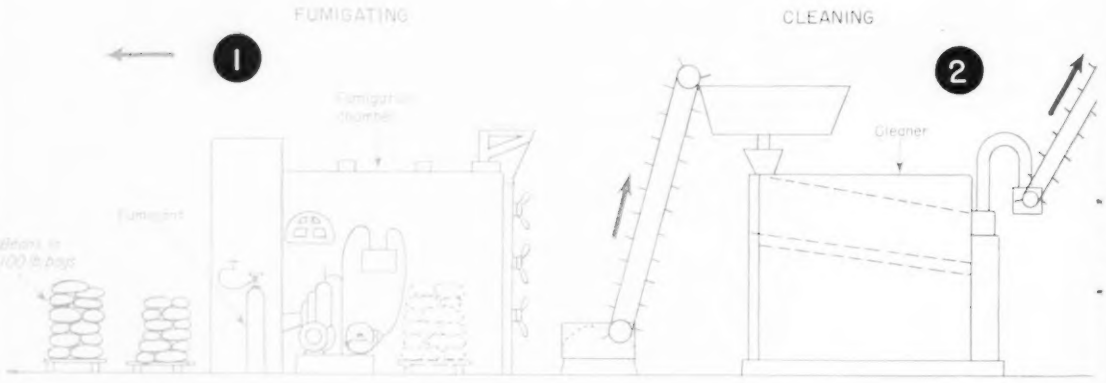
VOTATOR DIVISION



Simplified Chocolate-Making Line

Here's Advanced Alikonis Setup for Speeding Output of Quality Coatings

PRODUCTION of top-grade chocolate coating has now been streamlined in a process patented by J. Alikonis of Paul Beich Co., Bloomington, Ill. Successfully adopted in several plants, the new speedy system is stated to be within the scope of the average plant.

Our accompanying foldout flowsheet graphically illustrates the new system, which may be used, as shown, with conventional grinding mills.

First processing step—Point (1)—involves fumigating bags of cocoa beans with hydrocyanic acid. Next, beans are air-washed several times before going into a Bauer cleaner—Point (2)—that removes extraneous matter. Rate through cleaner is 3,000 lb. per hr.

Beans are now fed into a 15,000-lb.-per-hr. Jabez Burns continuous roaster that brings them to a 3 percent moisture content—vital for subsequent operations. To prevent over-roasting from residual heat, roasted beans pass through an air-cooled cylinder. Then they go on to the cracker-fanner.

Reduction of roasted nibs to liquor can proceed two ways in the new process: First, conventional grinding mills—Point (5)—can be used, with the pulverized material later introduced into the resultant liquor. Second, the nibs can be pulverized—Point (6)—in the new single step, along with other dry ingredients, to form a complete coating when later introduced into liquid materials.

Let's consider the first method: Three sets of triple Burr mills, operating in series, produce chocolate liquor that passes through a 325-mesh screen. Units handle 600 lb. of nibs per hr. Smooth liquor is now available for coatings without need for further refining.

Dry ingredients for coatings are proportioned from storage bins by a mixing screw that feeds a hopper supplying the highly efficient pulverizing operation developed by Alikonis.

Blended dry ingredients then continuously pass at about 1,000 lb. per hr. through the Mikro-Atomizer. Here, fine powder is carried upward by air-flotation from the pulverizer through a cyclone collector, where separated solids fall through an air-lock into a mixer. Particles escaping cyclone separation go to a Sly dust collector. From here, solids are carried by worm-screw conveyor to a chute feeding mixers.

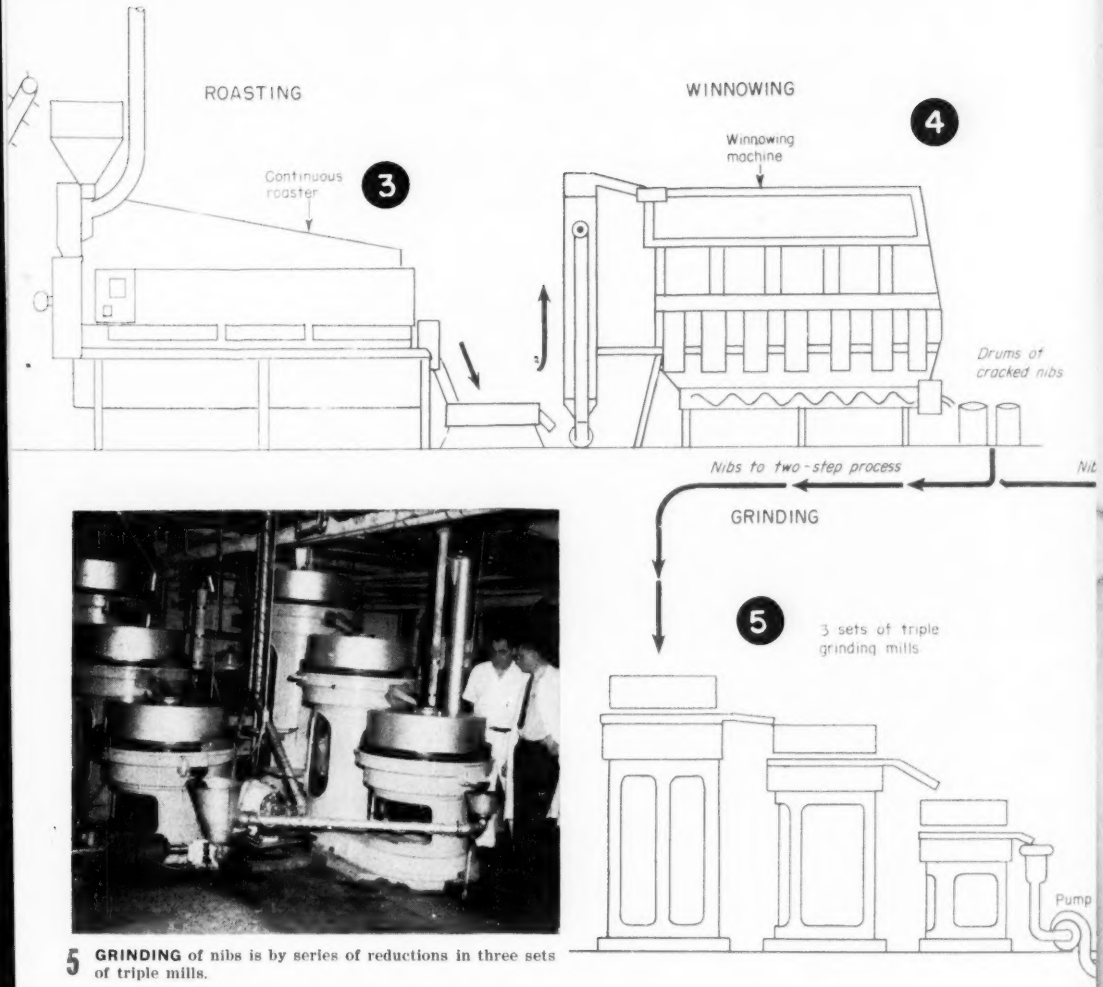
A series of 12,000-gal. Stehling tanks—Point (9)—receive chocolate liquor from grinders and also pulverized ingredients. Resultant mixed coatings are later pumped to enrobers through electrically heated pipes.

Now to the second method: Omitting use of the grinding mills, roasted nibs are handled as a dry ingredient and mixed with other "drys" before going to the pulverizer. This key unit is jacketed and air cooled to keep product temperature below the melting point of cocoa butter.

Pulverized ingredients are now chuted into Stehling tanks, where they are mixed with liquids such as whole milk and sometimes vegetable oils.

How "They Took in the Waistline"

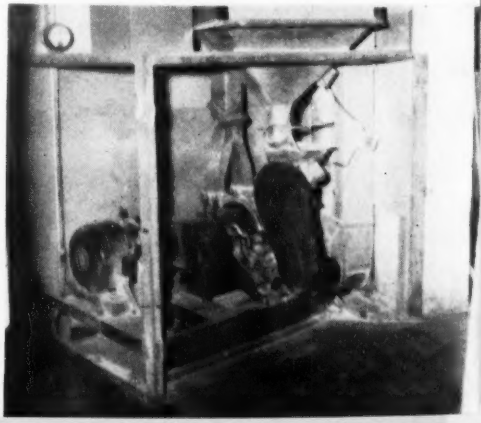
—of this commonly corpulent process is a most revealing story. It's cogently recounted in this month's special feature, "Radical Pulverizing Technique Short-Cuts Chocolate Refining"—which you'll find on page 62.

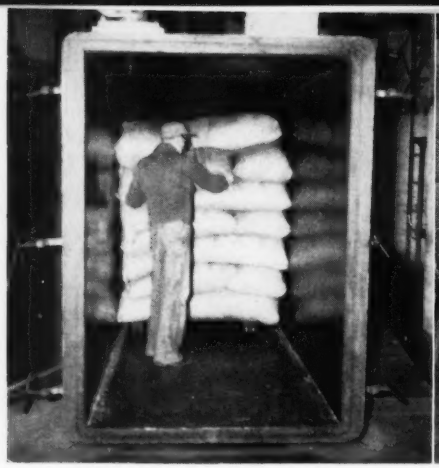


5 **GRINDING** of nibs is by series of reductions in three sets of triple mills.

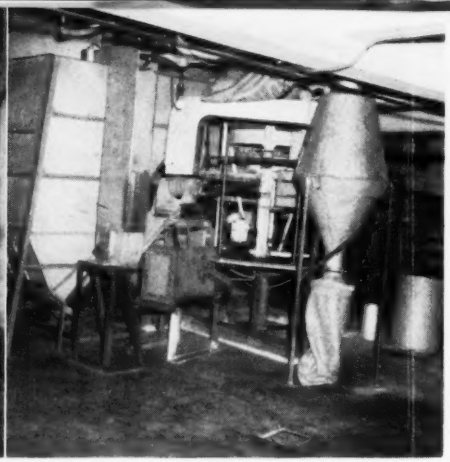
6 **BLENDING** of "drys" is vibrator and mixing screw job. Attendant adds minor material.

7 **PULVERIZING** reduces drys to powder, which blends with chocolate liquor without further refining.



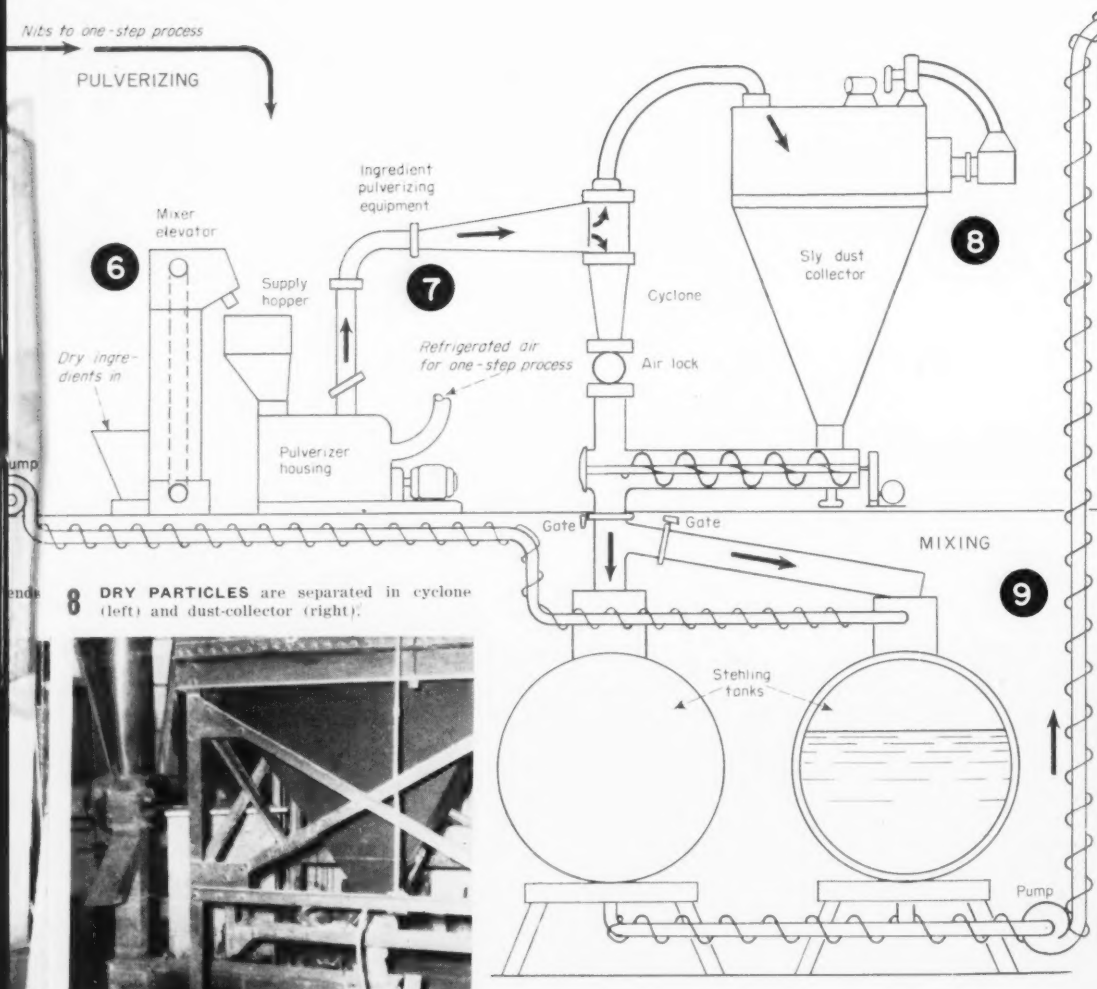


1 **FUMIGATION** of cocoa beans prevents possible infestation.

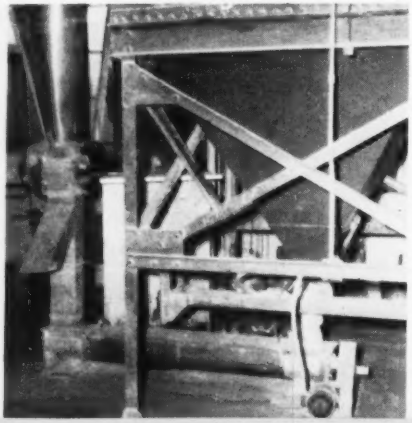


2 **CLEANER** sieves heavy objects, also removes lighter impurities via cyclone.

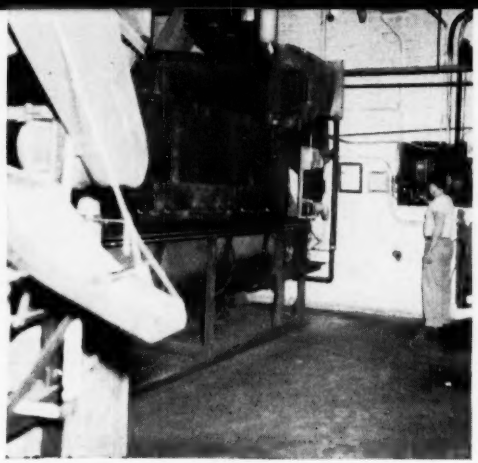
3



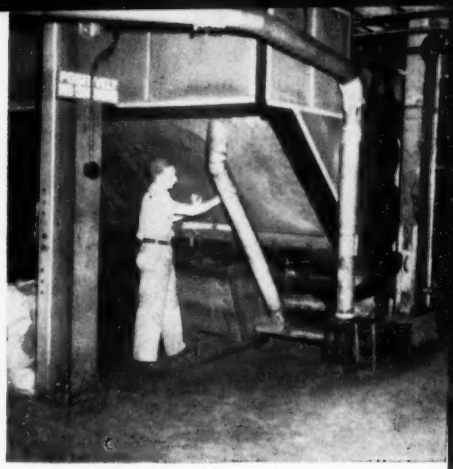
8 **DRY PARTICLES** are separated in cyclone (left) and dust-collector (right).



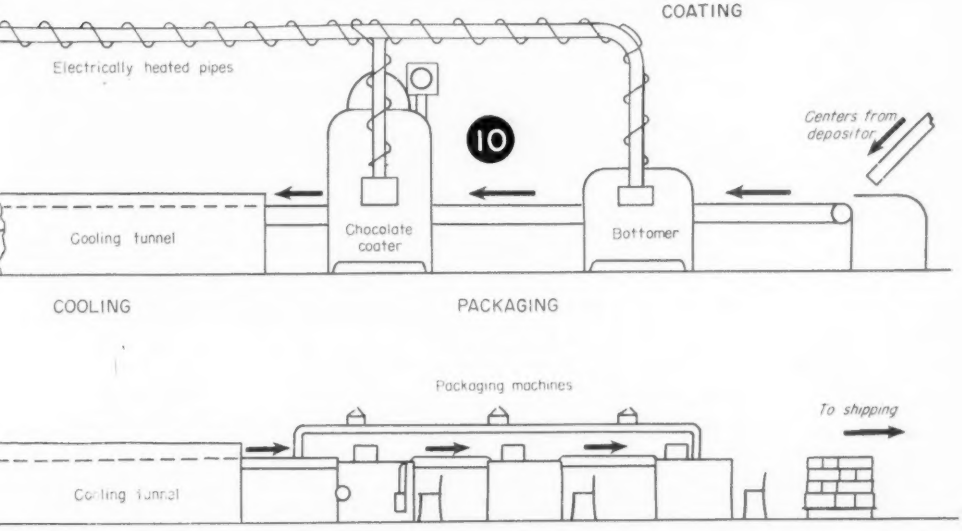
9 **INTO** Ste
Mixing fol



3 **ROASTING** of beans is uniform, and their moisture content is controlled.

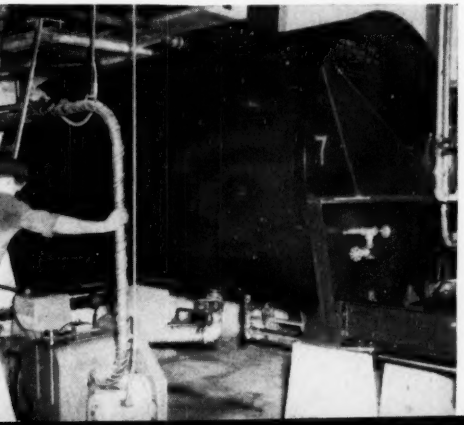


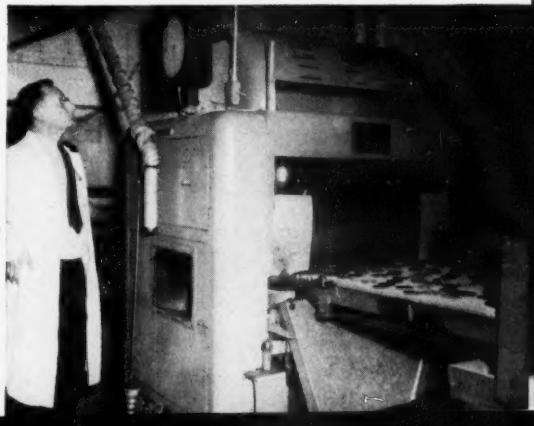
4 **WINNOWER** cracks beans, then separates shells from nibs.



INTO Stehling tanks holding chocolate liquor go the drys. Mixing follows.

10 **COATING** is applied to centers by enrober. Candy is then cooled.





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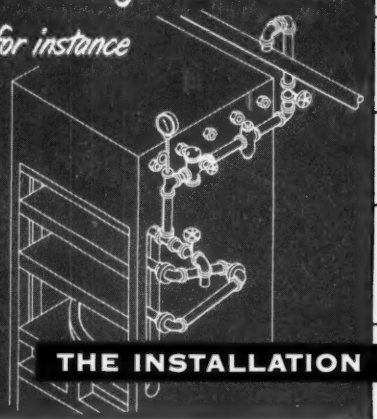
Will Your Pressure Regulators Last 25 Years?

...on Molding Press Service for instance



THE INSTALLATION

Crane Brass Pressure Regulators on steam lines to rubber molding presses; Dryden Rubber Division, Sheller Mfg. Corp., Chicago. 225 units in service.

VALVE SERVICE RATINGS

FEATURES:
Equally good on steam or air

SUITABILITY:
Steady outlet pressure - no drift

MAINTENANCE COST:
Routine servicing only

SERVICE LIFE:
Many installed more than 25 years — Still O.K.

OPERATING RESULTS:
Fully automatic steam control at lowest cost

PRICE:
Good Buy - has no equal

AVAILABILITY:
Stock item in Crane Line

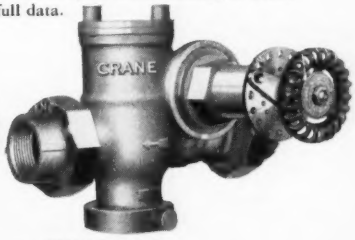
THE HISTORY

Steam generated at 130 psi is reduced through individual regulators on molding presses. Pressure used at machines is 60 to 100 psi depending on work. Features of regulator service needed most are: (1) non-fluctuating outlet pressure automatically maintained within close regulation; (2) easy adjustment by press operator to specified pressure for given work.

More than 25 years ago the plant standardized on Crane Regulators, a total of 225 being in use today. Many are the original installations, still delivering desired outlet pressure. Records for all regulators, regardless of age, show no maintenance cost other than prescribed simple routine servicing. On old models of the Crane 960 regulator, after prolonged service, this includes occasional regrinding of seats.

THE VALVE

Crane No. 960 Brass Pressure Regulators reduce steam or air pressures up to 250 psi, to within 80% of inlet pressure. Factory pre-set to operate within any of 4 ranges from 1 to 200 psi, with easily selected service pressure within set range. Precision made; fully automatic; highly dependable, even under reasonable fluctuation of inlet pressure. All wearing parts renewable. See your Crane Catalog or Crane Representative for full data.



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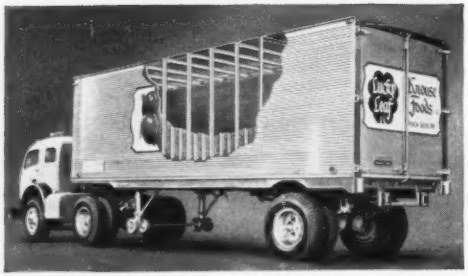
FRUEHAUF TRAILERS... built to ship Food Products SAFELY AND ECONOMICALLY!



THE FRUEHAUF STAINLESS STEEL VAN is both the safest and most economical Trailer built because it's constructed from chassis to roof of durable, rust-proof, corrosion-resistant, lightweight stainless steel. Box-type girders and weathertight body provide *complete cargo protection,* yet body upkeep is practically nil.

KNOUSE FOODS has discovered, like thousands of food shippers everywhere, that the Fruehauf Stainless Steel Van is the nation's *top-quality, most durable* Trailer. Easily damageable or perishable foods are shipped *without spoilage* and at *lowest possible cost* in Fruehaufs because they're precision-engineered, quality-built.

EXACT, POSITIVE TEMPERATURE CONTROL is maintained in Fruehauf insulated and refrigerated vans by lightweight, long-lasting Ultralite Glass Fiber Insulation. It is available in three standard thicknesses for varying temperatures. Ultralite is fire-proof, moisture-proof, rot-proof, and bacteria-proof.

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Aid or Trade?
A CRISIS AHEAD

A crisis in the foreign trade relations of the United States is in the offing. It is a crisis caused by:

1. Efforts of producers in friendly nations to earn more dollars by increasing exports to the United States, and
2. Efforts of industries in the United States which would be hurt by competition from these imports to keep them out.

This crisis is a threat to the effectiveness of American leadership in the crucial effort to build the nations of the free world into a strong and unified group. It is the purpose of this editorial to advocate a constructive approach to the difficult situation that is developing.

Background of the Crisis

Most countries in the free world—with American aid—have managed to push their outputs well above prewar levels. As they have done so, they have been urged by our highest government officials to increase their exports to us. Sales in our market enable these countries to earn dollars which they use in turn to buy the products of America's farms and factories. Thus, as they become self-supporting, the need of American aid is reduced.

But as these efforts to export more to the United States have promised increasing success, competitive American producers have become increasingly alarmed about what that success might do to them. Consequently, they are seeking more protection—by appeals to the U. S. Tariff Commission to recommend higher import duties and by appeals to Congress for new laws to discourage imports.

Our Friends Protest

A year ago Congress answered one of these appeals by imposing a quota on imports of dairy products. Now, among many other legislative proposals being strenuously pressed is a move to extend the scope of "Buy American" legislation. A year ago the U. S. Tariff Commission had only four petitions for increased import duties on its docket. Since then fourteen more petitions have been filed and others are definitely on the way.

Faced by these mounting efforts to block the sale of their products in the American market, no less than eleven friendly nations, including Great Britain, France, Italy, Canada, the Netherlands, Switzerland and Denmark, have filed protests with our State Department. Through many of the protests runs one refrain. Although stated in diplomatic language, it might be correctly paraphrased to say: *"In*

sending us aid you have made it very clear that you want us to get on a self-supporting basis at the earliest possible moment. But, when we begin to make headway in that direction by trying to sell you more of the things we are equipped to produce, you start closing your market to us." The threat of European resentment against the United States being stirred up by this argument is obviously great.

At the same time there exist grounds for special resentment in the United States against certain prospective imports of European manufactured goods – those of machine tools, for example. In part these will be produced with machinery that has been sent to Europe as part of our economic aid program. With absolutely no diplomatic language involved, the argument, which will be extended much farther than the facts would justify, will run: "*We gave those people the equipment that they now use to cut our throats!*" This line of argument will find response among workers as well as employers in industries faced by more competition from imports. Labor, too, is keen for protection against more foreign competition.

Aid or Trade?

As between continuing direct economic aid to Europe or accepting the imports that would make those countries self-supporting, some would prefer to continue the aid program. They argue that the tax machinery of the federal government can spread the burden of aid broadly, while we have no comparable machinery that can cushion the shock to individual industries, firms and communities that may result from stepped-up imports of competitive products.

As we see it, this position is untenable. It would make rubbish of our Atlantic Charter promise ". . . to further the enjoyment by all States, great or small, victor or vanquished, of access, on equal terms, to the trade and to the raw materials of the world which are needed for their economic prosperity." It would be an admission that, for all our profession of faith in competition and our opposition to European cartels, we really don't believe in competition.

U. S. Self-Interest

The people of this country have invested billions of dollars and seven years of hard work in the attempt to put our allies on a self-supporting basis. If we keep their goods out by raising trade barriers, we are directly defeating our own purposes.

Also, in moving to protect some groups of American producers we should be hurting others. For many American producers the export market, which this year will take about $14 billion of civilian goods, spells the difference between operating at capacity and closing down 25% of their facilities. When we discourage imports we cut off dollar earnings by other nations which are spent here to keep some of our factories and farms going.

At the same time, it must be recognized that certain American industries and their capacity to maintain employment will be hurt by increased imports. Hence it becomes critically important for the United States to formulate a national program designed to help these industries and communities take up the shock.

There is no neat and simple prescription by which this can be done, but several possibilities have been suggested. One on which there is general agreement is that tariff reductions should be gradual. To cushion their impact, the government might well give preference on defense orders to industries and areas adversely affected by an increased volume of imports. Direct assistance to workers and companies in shifting to different lines of business may be worth consideration.

These are by no means all the possibilities. They may not even be the best. But they do serve to suggest the necessity for flexibility and imagination in dealing with the growing crisis in trade relations. *Our ingenuity in developing new ideas to meet this crisis may well be a decisive factor in our effort to weld the free nations into a strong and durable alliance.*

McGraw-Hill Publishing Company, Inc.

THIS free-swinging, rail-mounted cart takes "back break" out of task of dragging hides to curing pack. Here, worker is pulling hides off cart to lay them on pack. Cart will then be used to pick up salt from bin (background).

Simplified Byproduct Handling

Track-suspended carts are employed in meat-packing plant for easy railing of hides from beef-killing floor chute to curing pack. Also used are special shaking and folding tables

J. M. SAMSON
Plant Manager, Camp Packing Co., Cortland, N. Y.

A notable increase in operating efficiency has been achieved in our Camp Packing Co. hide-curing cellar in Cortland, N. Y. This improvement has come about through the adoption of three quicker, more direct methods of handling cattle hides coming from the killing floor:

1. In moving hides to the curing bank.

2. In delivering rock salt from cellar bin to curing pack, and

3. In shaking salt from cured hides and then folding, tying, weighing, and loading them onto trucks.

Speed-up at the hide-curing pack has been attained with four specially designed carts, mounted on overhead tracks. Each cartload of hides is simply pushed from cellar hide chute to the curing bank. Hides are then separated from trimmings (ears, tails, and lips), pulled off the carts, and spread on the pack, fur-side down.

In this way, time for the task has been materially reduced. Formerly, the job called for bending over and sorting hides and trimmings from a pile, loading hides on flat trucks, pushing the flats to the pack, and then dragging the hides over the pack.

Now much easier, the work is carried out by one instead of two workers. Man-hours thus saved have now been applied on other work.

Cuts Down Clutter

There is another advantage in this new materials-handling system. With the old flat trucks banished, cluttering up of the work area has been eliminated. And space saved in this manner is used for putting down more hides on the curing pack.

The new method of handling hides is quite simple. Specifically, it entails the use of four 10x45x50-in. galvanized metal carts (see photo), each with an 8-in. wide pocket for trimmings. Carts are attached to angle-iron frames, mounted on a swivel that permits a 360-deg. swing. In turn, the swivel is suspended from an overhead track.

Each cart is pushed to the hide chute, which is located in the cellar directly below the cattle-killing floor. Next, ten hides are loaded onto the cart. Trimmings are now sorted from the hides and placed in the 8-in. side pocket. With the sorting completed, the cart is pushed to the center of the pack, where the hides are laid on the floor.

The same cart is then used to obtain rock salt from adjacent salt bin. Finally, the salt is sprinkled by hand over the belly-side of the laid-

out hides. Curing of the 8,000 hides takes about three weeks.

Standing, Not Bending

Now, briefly, for the point-by-point details of shaking, folding, tying, and loading the hides the new way:

Employed are specially designed shaking and folding tables and the same cart-handling system. Four men pull the cured hides over the 4x6-ft. open-top shaking table, with six wooden cross pieces (4x6's). As the hides are dragged over this table (fur-side up), salt is shaken from them. Next, the salt-free hides are pulled onto the 4x6-ft. flat-top, folding table, where two workers fold and tie each hide.

Formerly, the job of shaking, folding, and tying up the hides was done on the floor. Today, with the new system, the work is much simpler—employees performing their duties in a standing rather than a bending position.

Final steps are loading the hides onto the carts, which are pushed along a spur track to an overhead scale. After the hides are weighed, they are loaded directly onto trucks, with a minimum amount of physical effort.

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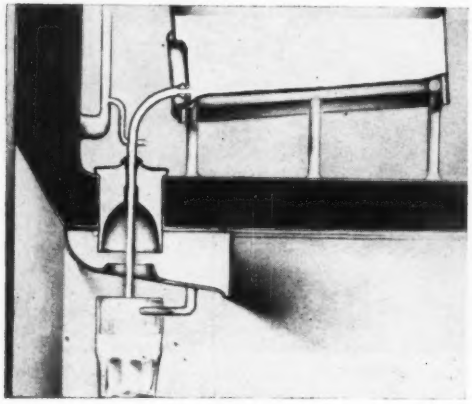
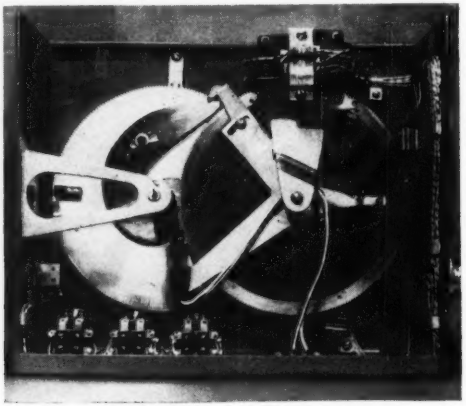


Safeguarded delivery is . . .



. . . electrically timed "to the drop"

Accurate, Sanitary Milk Dispensing

New unit assures protected delivery in amounts precisely controlled by a special timer—a device seen applicable in other food equipment

E. DALTON WHITE
FE Correspondent, Atlanta, Ga.

Troubles that heretofore hobbled accuracy and sanitation in units for dispensing milk and related fluid products are now reported surmounted in a machine engineered by L. M. Leathers' Sons of Athens, Ga.

Heart of the new dispenser is a high-precision electric timer (right photo above) that compensates for the change in pressure in the can of milk as the head is reduced by removal of liquid. The timer can be calibrated for any size delivered portion and can be operated with any capacity container.

This device is hailed as widely applicable in varied food industry operations where accurate dispensing measurement is demanded, such as in mixing milk concentrates or similar products.

The present milk unit was developed for use in Horn & Hardart Automat restaurants in New York City.

Sanitation is enhanced by the stainless steel construction, which lends itself to easy cleaning. In addition, the milk container employed is fitted with a sanitary rubber tube, sealed after sterilization, which connects into the delivery tube. This tubing is so arranged (see cross-section photo) that it cannot be touched or contaminated by the operator. The delivery orifice is also guarded from such contacts.

Integral with the delivery tube is an umbrella-shaped grommet which prevents condensate that may form on the can from running down upon the tube. Also, condensate that forms within the sanitary aluminum dispensing fitting is conducted to a tray underneath. All condensate runs into a drain.

Other sanitation factors include: (1) Constant refrigeration of the milk, and (2) prevention of splash through use of a slow closing solenoid valve on the delivery tube. The dispenser is stated to more than meet the code of the U. S. Public Health Service.

Several types of timers have been produced to meet specific requirements. Their accuracy is high, the basic unit having a maximum error of but 1/500 sec.—so small that in dispensing a glass of milk the difference is but a drop or two.

The dispenser was first initiated by W. A. Stevens several years ago, following experimentation with volumetric measuring and later timing. And design of the original cam-operated compensating timer was by W. F. Tufts. Highly favorable reaction of the milk industry to the timer then brought the Leathers' firm to finance and develop the idea into the present dispensing unit.

Swift Syrup Chilling

With *City-Water Savings*

Large volumes of liquid sugar are cooled quickly and economically by instrumented system having three-way cooling-water arrangement

WILLIAM J. MATHEWS
Chief Engineer, Refined Syrups & Sugars, Inc., Yonkers, N. Y.

It called for some astute thinking when a number of bottlers asked our company—Refined Syrups & Sugars, Inc.—to furnish 68 deg. Brix liquid sugar at the 70-deg.-F. temperature level ready for their processing.

This ingredient had been coming to them in the summer months at close to 90 deg. F., and sometimes as high as 95 F. So the idea was reasonable.

But how could it be engineered economically?

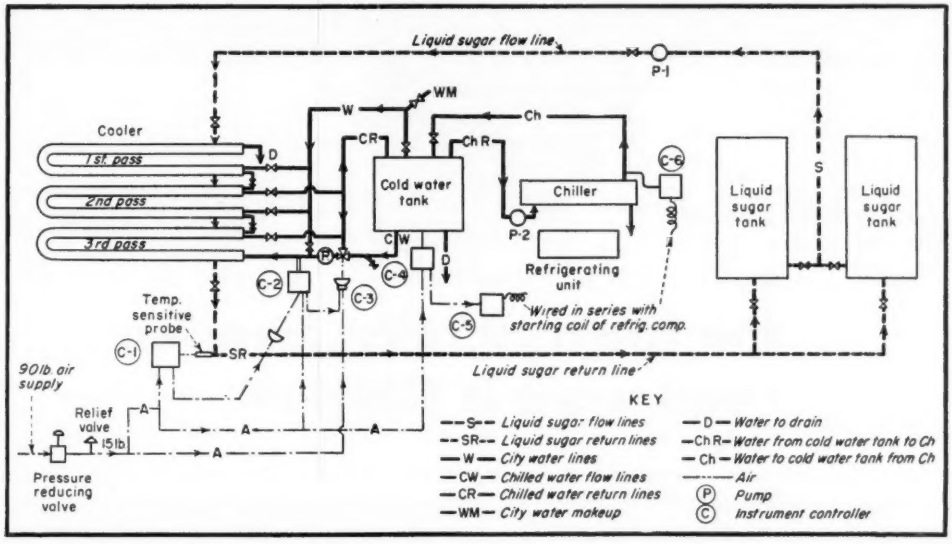
The ultimate answer of our engineers was a top-efficient system capable of cooling 1,250 gph. from 95 to 68 deg. F. using nine Griscom-Russell twin G-fin sections (925 sq. ft. of heat exchange surface). The outstanding features are—

- **Complete automatic control**
- **Flexibility in respect to coolant—using city water in great part rather than more expensive plain-chilled-water**
- **Adaptability to heating (as well as cooling), using hot water in the G-fin unit.**

The liquid sugar (68± 2 deg. Brix) flows from the botom of a storage tank through three rotary pumps and then three 1½-in. stainless steel lines to the top of the cooler. Each stream then flows in series through the shells of three sections of the cooler at a rate of 12.5 gpm. and then returns through a single 3-in. header to another storage tank.

Since the temperature of the stored liquid sugar tends to vary, the flexible

(*Turn to page 144*)



HOW LIQUID SUGAR IS COOLED. Used is three-pass G-fin unit (Griscom-Russell) employing city water, with plant-refrigerated water only when necessary. System is adjusted automatically by controls (Minneapolis-Honeywell) that compensate temperature fluctuations of liquid sugar and city water.

Temperature-sensitive probe in sugar return line actuates controller C-1 (Gradustat LO900AX2) to change setting on temperature controller C-2 (Submaster Gradustat LO902AX2) located in chilled-water line. C-2 in turn regulated C-3 (a three-way air motor valve, KO903) to proportion correct amount of chilled water to cooler.

When cold water tank gets too warm, temperature controller C-4 (LO900AX14) starts refrigeration unit and will cut it off as water is chilled to set point. C-4 operates through pneumatic electric relay C-5 (RO97A) which is wired in series with starting coil of compressor motor. C-6 (T415B) is inserted in chiller discharge as a low temperature limit control. It shuts off compressor if water gets too close to freezing.

P-1 represents three liquid sugar rotary pumps (Worthington 4GRU, 2 hp.), while pump P-2 circulates water through chiller. P-3 draws chilled water from tank into third pass of cooler alone, or into both third and second.

If you want all this in a tapered roller bearing . . .

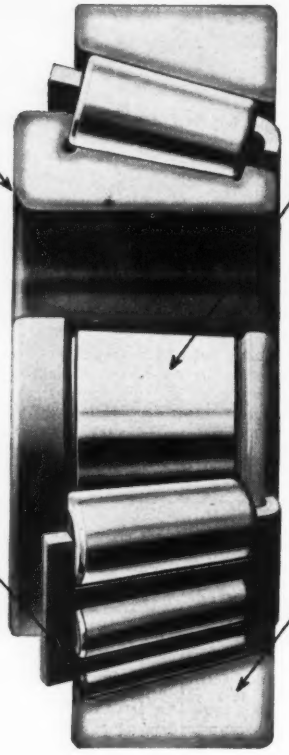
1 **GENEROUS RADIUS**—for greater shaft strength.

2 **CHOICE OF 26 DIFFERENT TYPES.**

3 **SOFT STEEL CAGE**—to keep rollers separate and prevent scuffing.

4 **PRECISION MANUFACTURE**—which makes possible bearings with a maximum runout tolerance of less than 75 millionths of an inch.

5 **CASE-HARDENED BEARING SURFACES**—to resist wear.



6 **MICRO-INCH SURFACE FINISH**—to minimize friction.

7 **CHOICE OF 5850 SIZES.**

8 **TIMKEN FINE ALLOY STEEL**—specially developed to give long bearing life.

9 **TOUGH CORE**—to resist shock.

10 **POSITIVE ROLLER ALIGNMENT**—to prevent skewing and give maximum capacity.

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Be sure every tapered roller bearing you use carries the name "Timken", the trade-mark of The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

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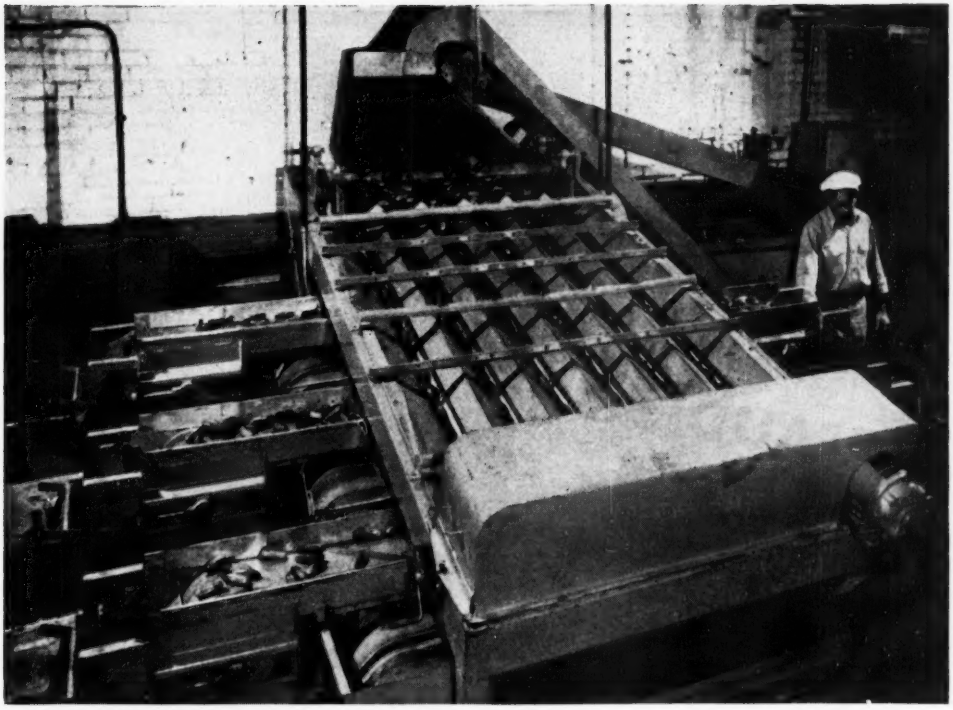
TAPERED ROLLER BEARINGS

NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION



PICKLES POUR from feeder to new "sizer." Hoods deflect them onto spinning rollers, and they're carried forward. Space between rollers increases gradually, and pickles fall, according to size, to belts running right and left below.

Fast, Labor-Saving Size Grader

Proved on Pickles . . . Will Handle Other Products, Too

FE STAFF

Solution is now seen to the difficult problem of fine-grading dill pickles for size by mechanical means rather than the tedious and costly manual method.

A machine designed to do the job was recently installed by California Packing Corp., San Jose, following extensive pre-testing for accuracy. It is now being operated on regular production runs to determine its actual plant capacity for replacing hand sorting.

▶ Present results indicate that each such machine will eliminate the need for ten manual sorters, releasing them for other work within the plant.

Initial rough grading of pickles still calls for use of a drum-type unit having a surface of diverging slats. As the drum turns, the smaller pickles fall through these slats to conveyors beneath the forepart of the drum. The large pickles move farther along within the drum until they reach apertures big enough to permit them to drop through—onto other conveyors.

In the past, these roughly graded pickles were then passed along for hand sorting by trained operators.

Now, however, after passing the drum grader, cured brine stock of certain sizes is routed to the new machine for fine size-grading. Along the way, nubs or broken pickles are removed manually before they can reach the unit.

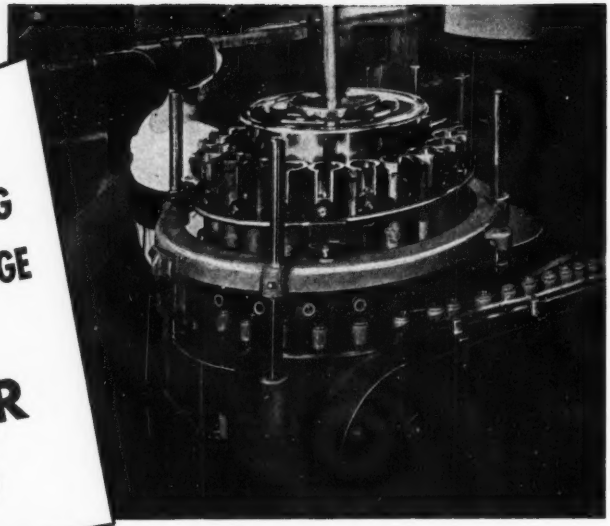
Since this is the first year of its operation, the new grader, made by Dudley Machinery Corp., Mountain View, Calif., is currently being run experimentally at less than rated capacity. It has been found that at one-third output the unit will fine-grade 70 to 80 barrels of pickles per 8-hr. day without need for any subsequent manual check grading. Estimated, top capacity is 200-250 bbl.

A Look at the Unit

This size-grader (see photo) consists of multiple pairs of stainless steel rollers mounted on an inclined bed. Sloped, stainless steel-plate hoods are suspended from cross bars above the rollers. Each pair of rollers is set at a diverging angle, close at the top, wide at the low end of the unit.

Pickles come into the unit on a conveyor feeding a shaker-type feed table, which disperses them in a uniform flow between the peaked-hoods onto the series of rollers.

YOU CAN PROFIT FROM FASTER FILLING AND REDUCED SPILLAGE with PFAUDLER FILLERS



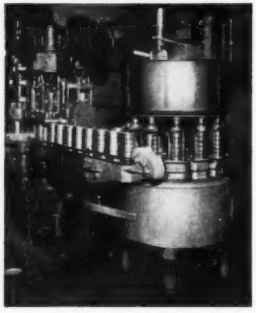
PFAUDLER PISTON FILLERS fill from 100 to 600 containers per minute, depending on the product being handled. Made in four models with container capacities to 5 qt.

Whatever your filling job, the chances are that you can do it at lower cost with a Pfaudler Filler.

With the **Pfaudler Rotary Piston Filler,** for example, the "no-can-no-fill" feature practically eliminates spillage and waste. No topping is required for glass jars because an instantaneous volume adjustment controls the fill within 1/10 of an ounce. And Pfaudler Piston Fillers operate so much *faster* that you'll need fewer units to do the job. This means lower labor, power and maintenance costs . . . mighty important factors in today's highly competitive food market.

FASTER TO CLEAN—EASIER TO KEEP SANITARY! Only a few minutes are needed to disassemble the piston and valves of the Pfaudler Piston Filler. No tools are required. And an added sanitary feature is the elimination of piston rings.

Pfaudler Gravity Flow Fillers are precision-built for extra-long service at high speeds. To meet your most exacting requirements, they are available with different types of valves—(1) open-air tube valves for standard products (2) closed-air tube valves for extreme accuracy (3) non-areating valves for minimizing oxygen content.



PFAUDLER GRAVITY FLOW FILLERS are made in five sizes to fill all products that flow by gravity in container capacities from 3½ oz. to No. 10.

Pfaudler

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Gravity Fillers · Deaerators · Piston Fillers · Vacuum Pans · Steam Peelers · Evaporators

An "over-under" chain drive revolves these rollers in an upward but opposing direction. This action serves to properly align the product so that it may drop through the interstice, and also tends to move it down the sloping rollers. A simple adjustment makes it possible to change the size of the space between the rollers, even while the machine is in motion.

Hinged baffles, fitted beneath each set of rollers, are adjusted with a lever. These baffles control the amount of product selected to drop on each one of the six transverse conveyors, located under the rollers. At the end of the latter conveyors, the graded pickles are caught in lug boxes and moved to salt tanks for storage.

Motors driving the various moving component elements of the unit are: ¾ hp., 1,725 rpm., for the rollers; ½ hp. gearhead, 230 rpm., for the six conveyor belts; and ½ hp. gearhead, 60 rpm., for the shaker.

Not Just Pickles

Although originally designed for handling pickles, the unit has also been shown in tests to be equally efficient on other products such as fruits, including those as soft as berries and figs. For grading figs, water flumes were substituted for conveyor belts in order to cushion the fruit dropping from the rollers.

Rated hourly capacities for specific fruits are: Cherries, 1 ton; apricots, 5 tons, and oranges, 10 tons.

Two other mechanical size-graders, designed for other products, have been tried on pickles at this plant. One is a citrus fruit size-grader. The other is a finger-type grader that moves pickles down a stationary diverging trough, and as the pickles reach an aperture corresponding to largest cross-section of the product, they drop through it and onto a conveyor belt.

These graders have not been entirely discarded in favor of the diverging-roll unit. However, this season's experience indicates that the newly adopted machine produces much finer grading than the others.

—*End*—

We Borrow Progress

—*Continued from page 56*

the medical profession. It is now recognized that there is a nutritional interdependence among different components of diet, necessitating a reorientation of viewpoint. Certain evidence now indicates that rapid early growth may actually be undesirable under certain conditions, leading to

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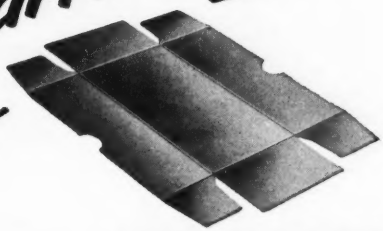

in place of CARTONS

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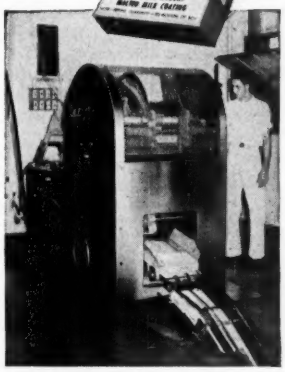
Place a Model PA Carton Former in your plant, and you're on the way to real savings. Using low-cost die-cut blanks, this ingenious machine produces sturdy, firmly-glued cartons in various sizes at speeds up to 102 per minute. It requires little supervision, for the blanks are fed automatically from a magazine that holds 500 to 1,000. The finished cartons are discharged right-side-up, and can be conveyed automatically to filling stations.

Single or double-walled cartons in many styles can be made on a PA machine. So it is very likely that the cartons you are now using can be adapted to this money-saving method with little or no change in appearance or utility.

If you are using factory-made cartons or are erecting folded cartons by hand, it will pay you to get full information on the Model PA.

Write for literature



Model PA Carton Former in plant of Hollywood Candy Co.

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overweight and increased instances of degenerative diseases in maturity. There are some indications that nutritionally optimal diets may not be desirable under certain specialized conditions in which the metabolism is abnormal.

One outgrowth of these studies is the concept that abnormal body metabolism is responsible for athero-sclerosis and that this disease is not an inevitable reflection of the aging process. An interesting result of this new approach is the current idea that the cholesterol ingested as such in the diet may not be so harmful in cardiovascular conditions as has been previously thought. Rather the surplus fats and sugars within the body may be the major source of cholesterol in the blood, suggesting that reduction of total caloric intake, rather than of specific foods such as eggs, may be the real answer to retarding the depositions of cholesterol in the arteries.

Further studies of the amino acid requirements of the human have shown that there is an interchangeability between ascorbic acid and ACTH in correcting the defective metabolism of aromatic amino acids in premature infants.

Other studies on the interrelationship of dietary factors have shown the interdependence and sparing action of methionine, folic acid, and vitamin B_{12} in the rate of growth and prevention of anemic conditions in experimental animals. Some of the most recent work in the field has been the addition of folinic acid or the citrovorum factor as of considerable value in the treatment of anemias and of importance in clinical management of leukemias, serving as an adjunct to the folic acid antagonists used in the clinical treatment of neoplastic diseases. This finding has been another example of the interrelationship of dietary factors with which nutrition research is so greatly concerned today.

It seems possible that extension of our knowledge in this direction may provide means whereby the modern degenerative diseases and derangements of metabolism such as cardiovascular diseases, diabetes, kidney disease, neoplastic disease, and rheumatoid diseases may at last be brought under control.

The above article is based on a paper presented before the American Institute of Chemists, May 7, 1952. End *(Resume reading on page 57)*

Processed Cheese

—Continued from page 67

cheese are assembled by the blender—cheese food ("La Chedda"), American processed cheese, and pimento cheese—and the plant may run any of these on one day to fill orders or add to warehouse stock.

A typical blend for a 475-lb. batch of American type processed cheese could include 75 lb. current, 50 lb. short held acid, 200 lb. slightly acid short held, 100 lb. slightly alkaline short held, and 50 lb. aged cheddar.

Process Meshes With Blending

Once a desired blend is assembled, smooth handling is required to keep it intact during volume processing. This is accomplished by a system of conveyors, which moves the product, in timed sequence, through the operations of batch-up, feeding, grinding, cooking, and filling.

Here's how the sequence operates: At the feed-in area, tempered cheeses

What's Coming Up in FOOD ENGINEERING

Slated for early issues of FE are practical articles a-plenty—every one aimed to aid you in doing a better job of making quality foods at low cost, with the accent on the "how." To name just a few—

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Advanced Practices Gear Plant for Multi-Product Output

What Are You Going to Do With Your Next Raise?

CO_2 Versus Beverage Bacteria

Bakery Research and Education Geared to Progress

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Leading Confectioner Goes All Out on Efficiency

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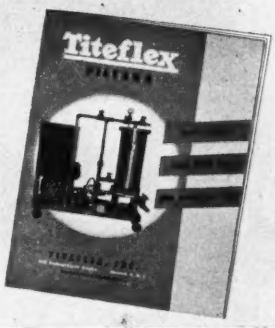
REDUCE FILTRATION TROUBLES!



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PLASTEX is Buffalo's regular Solid Woven Cotton Belt covered with a tough coat of plastic that won't crack or peel, is impervious to oils, greases, acids, alkalies, and moisture and withstands temperatures from -20 to 200°F. PLASTEX won't absorb or exude ANY ODORS and can be easily and quickly cleaned by ANY method . . . including steam. Fully pliable, it requires no special care and will last longer than *any ordinary untreated conveyor belt.* So . . . if you want to "keep it clean", get yourself some PLASTEX. Ask your jobber or write BUFFALO direct. (They're the only company that makes it).

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are unhooped—the hoops are sent off by means of an overhead belt conveyor—and about 10 percent are check weighed. Then they move into the cleaning and weighing room on a roller conveyor.

Cleaning consists of stripping off the cheesecloth and removing paraffin or foreign materials by scraping.

Next, the product moves to a portion of the roller conveyor that forms a raised platform for a Toledo scale. Here, an attendant—with the predetermined blend-proportion to guide him—weighs up an exact 475-lb. batch, which then moves (on a stainless steel belt-conveyor) into the cook room and is elevated to feed a Damrow grinder.

Grinding of each batch into small flaked particles is accomplished in 1½ min. The grinder's flat bladed rotor, turned at 1,800 rpm. by a 100 hp. motor, forces the product through a ⅛-in. mesh screen.

Movement of the feed conveyor is integrated with each charge—so the grinding operation actually paces the weighing-up of batches in the cleaning room.

Two gravity fed cookers (operating in sequence) receive the cheese from the grinder. These are actually stainless steel jacketed melting and mixing machines designed and fabricated by the company. They heat and melt the product through direct injection of 155-deg.-F. filtered steam. Mixing is by action of a screw moving and recirculating the cheese.

During the cook, emulsifier, salt, coloring, and additional water are added. Since each cook takes 3 min., the total hourly capacity of the two machines is 20,000 lb.

Containers Assembled and Filled

While processing operations are in progress, another room on the same floor level employs four U. S. Automatic box machines to assemble the required 2- and 5-lb. containers for filling. Two of these machines run tops, the others bottoms. Assembly rate is 50 boxes per minute per team of machines. Completed containers are chuted down to the filling floor below.

Hot processed cheese gravity feeds through a spout from the cookers to the reservoir of a Nelson filling machine located directly below. A company-installed electric eye controls the level in the lower discharge tank of the filler so that a constant head of product assures an exact weight-by-volume fill. This technic has allowed a speed-up of filler valve operation to 48 boxes (5 lb.) per minute.

The hot cheese is deposited in a Pliofilm pouch which lines the box.

This pouch is then tucked, the box closed, dated, and arranged on a pallet with air spaces between each box to facilitate cooling. When filled the pallet is trucked to a location served by direct air circulation from fans. Here, it is stored for 24 hr.

After cooling, the boxed cheese is packed (six to a 30 lb. shipping unit) by a company-designed casing machine. Then, after passage through a Standard-Knapp sealer, the cases are given a lot number and palletized for movement to the shipping platform.

Tests Tied to Process

A program of quality control tied in closely with daily production has proved one of the best uniformity safeguards in our operation. Running samples are taken at the cooker and from finished batches, and results of the tests are charted for conformance to a desired standard. If any deviation from the mean is spotted, the laboratory then works closely with the blender to correct the situation.

At the cooker, a 4-oz. hot sample is drawn from every fifth batch. This is tested for moisture, fat, and fat in dry product. Observations here permit a close control of the cooking procedure and also catch any deviations that might have occurred.

About four boxes are selected from each day's run and subjected to the following six tests:

1. Weight is checked to be sure that it is running within ⅛ oz. in the 2-lb. loaf and ¼-lb. in the 5-lb. loaf.
2. Slices are cut from the loaf to observe whether the cheese sticks to the knife. This is important virtue from the customer's standpoint.
3. Break—a slice is bent to see if it breaks cleanly. Weak or brittle processed cheese is poorer for sandwiches.
4. Body of the sample is checked for quality—firm, medium, or soft.
5. Taste is checked for sharpness and blandness.
6. Melt-down—a special test designed to evaluate the cheese for melted cheese sandwiches. Here, a ½-in. plug from the loaf is placed on a petri dish and steamed for 10 min. An ideal product melts completely in this time. Profiles are made of the melt (the flatter the curve the better the result).

While most of these running quality tests are designed to evaluate the cheese from the consumer's standpoint, the melt test is the most unique. Special care in processing our cheese for this factor has resulted in a surprisingly good selling point—product "meltability." This is indicated as much appreciated by the housewife and counterman.

End (*Resume reading on page 68*)

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MAINTAINS IDEAL PRODUCTION WEATHER IN YOUR PLANT—EVERY DAY —YEAR ROUND
KATHABAR Humidity Conditioning equipment saves money for food manufacturers and processors in these critical operations:
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For cost-minded executives: **In many cases, Kathabar equipment has paid for itself in the first year.**

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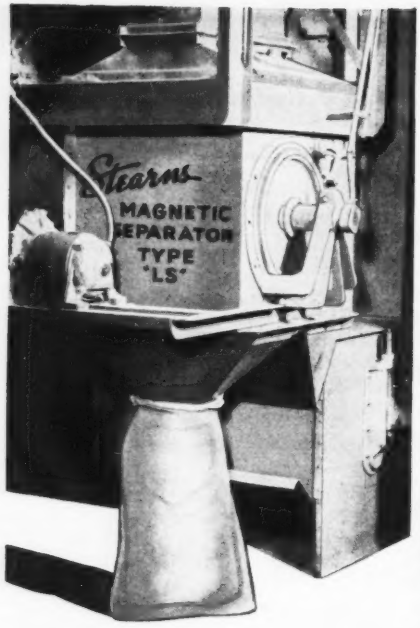
CITY.....ZONE.....STATE.....

For more information, use post card on last page.

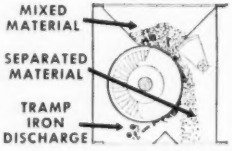


FORGET TRAMP IRON

WHEN YOU INSTALL Stearns MAGNETIC SEPARATORS cut processing costs this sure way!

● *That's right* — forget tramp iron by installing a STEARNS Magnetic Separator. Eliminate all tramp iron dependably, automatically just as this mid-western soybean processor is doing. Installed between a screw conveyor and the intake of a bucket elevator, this STEARNS Type "LS" removes all tramp iron from the feed concentrates before going into the pellet machines. RESULTS? The product is purified and the pellet machines are protected.

● *For your separation problem . . .* Whether you are processing soybeans, feed, grain, flour or some other product, a STEARNS Magnetic Separator is your best bet to purify your product and protect expensive pulverizers and grinders. Avoid shutdowns and costly repairs — remove all tramp iron with STEARNS electro and permanent magnetic separators. Note how tramp iron is separated and discharged automatically.



A SEPARATOR FOR EVERY NEED

Electro and permanent magnetic separators, pulleys, filters, plate magnets, spouts and drums — all EXPERIENCE ENGINEERED to meet your requirements.

Type "LS" (left) and Type "LP" (right) are particularly designed for dust-tight applications and are built as a complete unit for direct attachment to spouts and chutes. Electro and permanent magnetic models available in all sizes. Write for descriptive literature.

8552C

Foremost in the Magnetic Field

Stearns MAGNETIC INC.

667 South 28th Street, Milwaukee 46, Wisconsin

Canned Beer

—Continued from page 71

Purges, operated by a steam and water ejector, are used to maintain the desired pressures in both the absorber and the generator shells.

Absorption machines of this type are made in capacities up to 350 tons. The unit in our Hampden plant will furnish up to 112 tons of refrigeration when producing chilled water at 37 deg. F. After running continually for two years, the only maintenance necessary has been renewal of rotating seal on the solution pump.

Once started, the machine responds automatically to load changes. The operator merely starts it at the beginning of each day, checks it occasionally, and stops it at the close of the working day.

End (Resume reading on page 72)

Radical Pulverizing

—Continued from page 64

Such reassuring success overseas, coupled with recent granting of patents, gave firm basis for American marketing of the process. Accordingly, consultation is under way with a number of U. S. confectioners, and widespread installations here should soon by a reality.

Alikonis' original goal—development of better chocolate coatings for the Military—is now in rewarding fruition. In June, 1951, through efforts in conjunction with K. T. Farrell, of the Quartermaster Food & Container Institute, a major objective was won—achievement of a highly palatable cocoa-type coating that can be held at 120 deg. F. for long periods without stickiness or bloom.

A good deal of the success of this new military coating lies in use of the Alikonis process. First of all, a control of particle size in the process, where cocoa powder, non-fat milk solids, and sugar are pulverized together, provides an even coating that is able to smoothly incorporate hydrogenated coconut oil as a primary source of fat. Teaming of this relatively high melting fat with a combination of nonionic emulsifiers provides the high stability in the new coatings.

Coating and subsequent enrobing of the ration disks are high-speed, continuous operations. Dry ingredients are pulverized at over 1,000 lb. per hr. and incorporated into liquid in a series of constantly discharging Stehling tanks.

The mixed coating is then rapidly

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or WRITE

PFIZER

for PROMPT DELIVERY on

Ascorbic Acid

• Give us the go sign "Ship Today" and we'll immediately dispatch Ascorbic Acid for *all* your frozen fruit and juice processing needs.

Remember, Pfizer Ascorbic Acid checks the oxidation that causes browning and flavor loss. It gives your fruit packs protection before, during and after freezing. Added to juices, Pfizer Ascorbic Acid enables you to prevent flavor deterioration and, if desired, to standardize the Vitamin C content.

CONTACT PFIZER FOR YOUR ASCORBIC ACID NOW!

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PFIZER

For more information, use post card on last page.

BEARINGS THAT LEAK LUBRICANTS INTO PRODUCTS
PRODUCT
EXCESSIVE CLEA
GASKETS
MESS AND HAZARD
FOOD PLANT PROBLEMS
find the Solutions with TEFLON
These and many more problems in food processing, are being solved with TEFLON*, duPont's new wonder plastic fabricated by the United States Gasket Company.
Keep these unique Teflon properties in mind. It is inert to all food acids, alkalis, detergents; non-contaminating, tasteless, odorless; non-absorbent, bacteria resistant, easily cleaned; tough, resilient, long-wearing; non-flammable; serviceable from —110°F. to 500°F.; has an extremely anti-hesive, slippery, waxy surface.
Consider it for pump impellors that won't gall and freeze on the most difficult solutions. For no-lubricant, non-contaminating bearings and pump and valve packings. For non-contaminating, durable gaskets, expansion joints and accessories for glass and stainless steel piping. For covering header rolls on bakers dough sheeters, etc. For permanent candy molds to replace starch. For sanitary work surfaces and coverings for conveyors, guide rails, trays, etc., that wipe clean of the stickiest substance, quickly and easily.
Teflon is available from the United States Gasket Company in sheets, tape, engineered packings, cut and molded gaskets and covered rolls.
Ask for catalog or tell us your requirements.
UNITED STATES GASKET COMPANY
FLUOROCARBON PRODUCTS DIVISION
FABRICATORS OF TEFLON, KEL-F AND OTHER FLUOROCARBON PLASTICS
CAMDEN 1, NEW JERSEY
*duPont's trademark for its tetrafluoroethylene resin

pumped through an electrically heated pipe at 120 deg. F. to an enrober, which handles 21,000 disks per hr. Circulation of the coating through the enrober is very rapid to prevent its "setting up" at temperatures below 120 deg. F.

After enrobing and passage through a cooling tunnel, the disks are carefully inspected by a Quartermaster Corps representative just before packaging. Although the tests do assure the product's conformance to military specifications are quite severe, the excellent control of ingredients in the Alikonis blending technique has virtually eliminated rejections.

End (*Resume reading on page 65*)

Lift Trucks

—*Continued from page 69*

such bottlenecks as limited storage space and delays entailed in the old manual movement of goods. In today's operation there is no merchandise holding up the production line.

In eliminating the old two and four-wheel hand trucks, the lift trucks have permitted warehousing functions to be spread into new areas where such operations were formerly unfeasible because of distance.

Smucker's ships its products both by rail and truck. The company owns eleven complete tractor-trailer units and hires outside fleets when needed.

Normal assignment to the shipping department is two lift trucks with drivers and six men. As stated, the trucks work directly into the carriers. Men inside whisk the goods off each incoming pallet, which is then taken back by the truck for a refill.

Employee accidents have been reduced to practically zero because of the care exercised in material handling and the modern layout of facilities. The work is now easier with less accidents from strain on the men.

The former—the 4,000-lb. truck—has a 4-cylinder engine, 27½ bhp. at 2,000 rpm. Speed of travel is up to 7 mph. This truck has a 9-in. inside, 72-in. outside, turning radius and can be pivoted in 63-in. intersecting aisles. It has a maximum lift of 132 in. and weighs 5,260 lb.

The latter truck—the 5,000-lb. unit—has a 4-cylinder engine, 41 bhp., at 2,000 rpm. Speed of travel is up to 8 mph. This truck has a 21-in. inside, 90-in outside, turning radius and is capable of maneuvering in 71½-in. intersecting aisles. It has a maximum lift of 144 in. and weighs 7,890 lb.

Pallets used throughout the plant are 48x48 in.

End (*Resume reading on page 70*)

Modern meat packages must do more than just protect your product. Shoppers want to see the meat they buy. Look-Pak is actually a protective showcase.

Link sausage, wieners, sausage meats are clearly visible. Brand name, price spot, product identification printed directly on paperboard band in brilliant, undistorted color combinations. Clean appearance and rigid feel of Look-Pak gives customer sense of cleanliness and quality.

Shows off your brand!

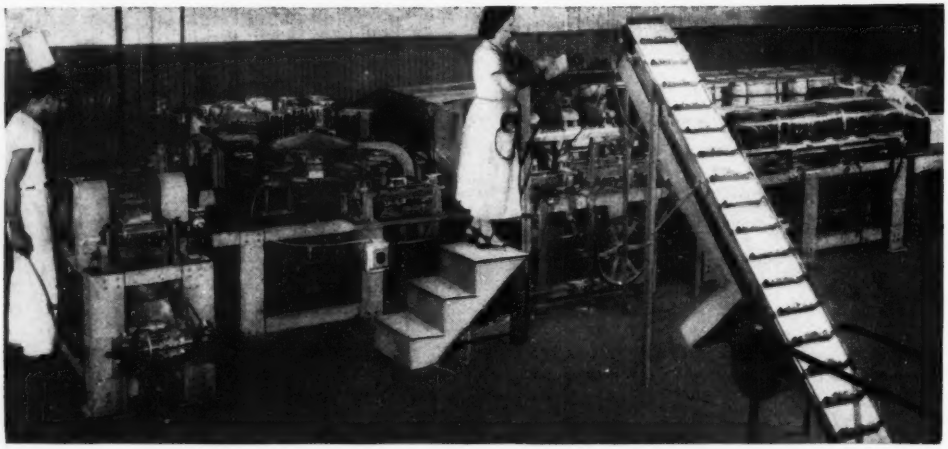
Marathon
Look-Pak
merchandises meat

Shows off your product!

Look-Pak is designed and engineered to give you faster production and greater economy! See your Marathon sales representative or write Marathon Corporation, Menasha, Wisconsin.

Marathon
packaging that sells food

NEW PACKAGES & PRODUCTS



CANDY is packaged in a continuous three-station operation of forming container, filling, and closing. From the printed roll of ply-foil, at lower left, machine cuts sheets, forms sheets over mandrels, then sets formed containers open-end-up to receive candy. Conveyor belt on right brings candy up from a lower floor to spill into three automatic weighing and filling devices, which in turn drop right amount of candy into waiting containers. Filled containers pass on to be automatically closed and are then conveyed to end of machine and packed into shipping cartons.

Kodachrome-Illustrated Ply-Foil for Candies

Developed for protective and sanitary value in self-service markets, new rectangular aluminum-foil packages have been designed for The Charm Candy Co., Asbury Park, N. J., for four of its popularly priced candies—gum drops, spice gum drops, assorted hard candies, and sour balls.

The company has long used the single sheet of color-printed heavy gage foil. But now making use of modern developments, the new package is even more economical and personalized.

The major change is one of material. The new pack is formed of a multi-ply sheet composed of foil, paper, wax, and foil. Appearing to be a solid sheet of aluminum, it has considerably more rigidity than the former all-foil package.

Design-wise, the sales impact of the new package has been very effectively stepped up. A full-color Kodachrome of the candy inside the package has been reproduced on the foil with excellent clarity and accuracy of color and detail. The Kodachrome completely covers the package, with the Charms name superimposed, giving all the advantages of seeing the confections with none of the hazards of exposing the product. In addition the package lends itself to more attractive display through its colorful appearance and convenient shape.

Keeping tests showed these products to be in near-perfect eating condition at the end of two years, demonstrating the protection offered. This factor makes it an excellent package for shipment to humid regions, for export, and for military uses.

The ply-foil material is shipped to the company in printed roll form, which is an economical factor. Plant storage space for holding sizable inventories of this rolled stock can also be kept to a minimum.

Reynolds Metals Co., New York City, supplier of the ply-foil, worked with Wright Machinery Co., Durham, N. C., in developing the equipment that handles this new material. The machine takes the printed stock, and in one continuous operation forms the container, fills it, closes it, and delivers the completed package ready for the shipping container.

For More Data on Package and Equipment Supplies Named Use Reader Service Card

Better Glass Means Smoother Production...
–ARMSTRONG'S

To keep your lines flowing smoothly and efficiently, you need a glass that will reduce costly rejects and downtime. And that's where Armstrong's Glass Containers can do a job for you. They are blown to rigid specifications on modern precision machines. This closely controlled production gives the accurate finish and extra strength essential to stepped-up production.

See your Armstrong representative for all the facts about our complete packaging service or write Armstrong Cork Company, Glass and Closure Div., 4207 Prince St., Lancaster, Pennsylvania.

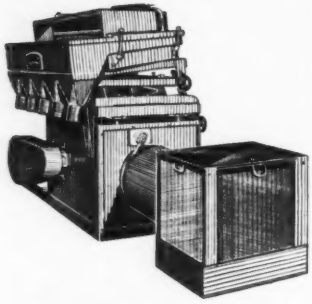
Packaging headquarters for Metal and Artmold Plastic Caps, Corks, Crowns, and Du Pont "Cel-O-Seal" Bands

ARMSTRONG'S GLASS CONTAINERS

we can give you

58

good reasons why...



...it makes good sense to sit down and study out all the economic advantages of cleaning, classifying, and up-grading dry food products with Sutton Specific Gravity Separators and Air-Float Stoners. Upon request, you will immediately receive a list of 58 different food and cereal products, each representing a distinct separating problem solved by *"effecting a difference in specific gravity through air-flotation."* Chances are, the S S & S Process will answer your problem, too.

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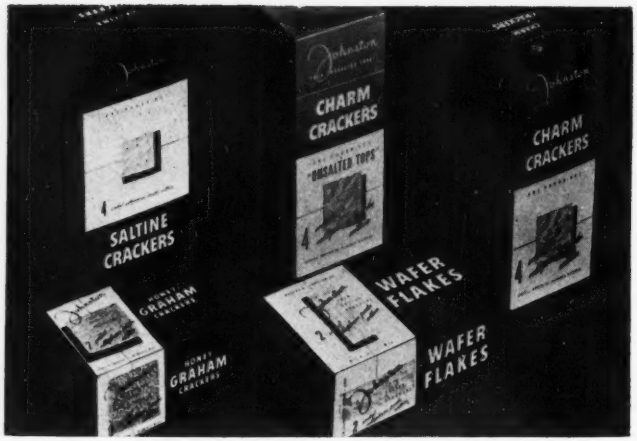


Color Emphasizes Display, Aids Identification

To make it easier for the consumer to differentiate among the many varieties of its cracker items, Robert A. Johnston Co., Milwaukee, has redesigned its packages, using color for easier identification.

The change did more than solve the problem. In addition, the striking colors considerably stimulated sales.

Family similarity is retained throughout. The Charm cracker carton remains in the familiar red and yellow. Saltines are now packed in a predominately blue carton, the Wafer flakes in green, graham crackers in brown, and a new item—Unsalted Charms—is identified in an orange-colored carton. An illustration showing the contents is also employed on the packages.

Sutherland Paper Co., Kalamazoo, Mich., manufacturer of the cartons, worked with the company in designing the new line.

For Package Data Use Reader Service

Bite-Size Frozen Seafood

Completely cooked, frozen sea scallops, haddock, cod, ocean perch, and flounder—all in bite-size portions—are now being marketed by Fulham Brothers, Inc., Boston, under its "4-Fishermen" label.

These products are processed, cooked, and quick frozen as soon as the catch is unloaded at the company's modern plant. The housewife need only heat and serve.

Attractively designed, the packages carry the same brand and label design as is used on the company's uncooked frozen products. Each variety is color-coded for ready identification of contents.

Frozen Food In Cans

Continental Can Co., Inc., New York City, reports increasing acceptance of metal cans for frozen fruits and vegetables.

The containers are now in considerable use among fruit and berry processors, with market tests being conducted with various vegetable packs.

Advantages cited in the use of the metal cans include speeding up of fill-

ing operations, elimination of leakage problems, and maintenance of high-quality in the frozen products.

At present, Continental is offering the cans in No. 1, 2, and 303 regular sizes, and in the No. 10 institutional size.

Champagne? No, Ale!

A specialty beverage which looks and tastes like a champagne but is actually a malt liquor is being distributed by Metropolis Brewery of N. J., Inc., Trenton. Called "Champale", the beverage is light and sparkling, having the taste of dry wine or champagne with just a slight maltiness discernible.

In addition to single-bottle sales, a 3-bottle carrier, designed and produced by The Seasongood Folding Box Co., Harrison, Ohio, is being used in the company's merchandising campaign.

For Package Data Use Reader Service

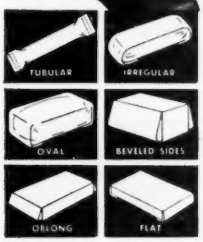
Sample Pack Promotes Brea

A new idea in food-product promotion has been instituted by The Cottage Baking Co., Piqua, Ohio, for its "Betsy Ross" oven-fresh bread.

Two slices of bread are heat sealed

One minute, please...

AND 120 MORE UNITS ARE FULLY PACKAGED READY FOR MARKET



AUTOMATIC, HIGH SPEED WRAPPER SETS NEW HIGHS IN PACKAGING PRODUCTION AT NEW, LOW COSTS PER UNIT!

Eliminate production bottlenecks with the continuous feed Campbell Wrapper — the machine that packages at *amazingly high speeds* (even-up to 180 per minute) and cuts material and labor costs at the same time. Most installations require only one operator to feed and one to box-pack. Machine uses wrap materials of all types in minimum amounts and in numerous cases eliminates need for trays or stiffeners. Imprinted labels position perfectly, *automatically*. The Campbell Wrapper is also oblivious to the *kinds* of products it wraps — Delicate, fragile or solid products, foods requiring flavor-freshness protection, or ones that must resist crushing are all packaged with equal ease. Shape is no problem either, for it wraps products of almost *any* shape — and packages them in *single* or *multiple* units per package. Write today — learn fully how the Campbell Wrapper can package your products.

We are contributing to the nation's defense program by providing a large part of our increased production facilities for building precision armaments.

New York office 55 West 42nd St.

Write for illustrated booklet

Campbell WRAPPER

HUDSON-SHARP MACHINE CO. • GREEN BAY, WIS.

Manufacturers of Aniline and Gravure Presses, Folders, Interfolders, Laminators, Waxers, Embossers, Slitters, Sheeters, Roll Winders, Packaging Machines, Creepers and Tissue Converting Units.

NEW

POCKET SIZE pH METER

Nothing Like It!

Uses Electrometric Principle

- **ELIMINATES indicating solutions, measurements of sample, and color matching.**
- **ELIMINATES errors due to sampling techniques, turbidity, and presence of oxidizing or reducing agents.**

And Provides—

- **INSTANT, continuous, direct reading of pH with no buttons to hold down or dials to turn.**
- **CONTINUOUS reading over full pH range with no changes of solutions or adjustments.**

REVOLUTIONARY PROBE UNIT PROVIDES ON-THE-SPOT pH READING *ANYWHERE*

- **ELIMINATES supports, holders, beakers, and separate electrodes.**
- **ELIMINATES trips to the laboratory.**

Completely self-contained in water-proof ever-ready case with shoulder strap.

PRICE $125.00

Instrument size: 3 x 5⅞ x 2½ inches
Case size: 3¾ x 6½ x 4⅛ inches
Weight with accessories: 3 lbs.

ANALYTICAL MEASUREMENTS, INC.
585 Main St., Chatham, N. J.

Please Send Full Information To:

Company _____

Street _____

Name _____

City *Zone* *State* _____

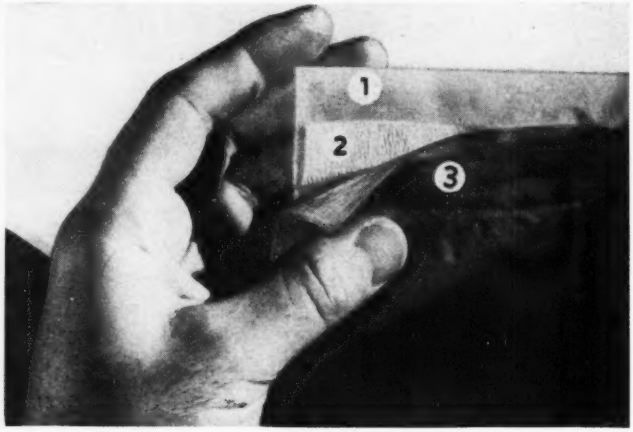
inside a shiny cellophane sampling bag. The lettering "Free Sample" and the company name are subordinate to a reproduction in red, white, and blue of the bakery's full size loaf.

These samples are offered to various organization for such affairs as civic luncheons, church suppers, and industrial picnics.

The only requirement the bakery imposes is that the bread be served to individuals while still inside the identifying sampling bags. And there is not likely to be any objection, for besides getting free bread, these bags offer sanitary, convenient handling.

Bags are designed and made by Milprint, Inc., Milwaukee.

For Package Data Use Reader Service



Three-In-One Wrap for Smoked Meats

A new packaging unit for wrapping hams and bacon, called "Trip-L-Wrap," is available from Paterson Parchment Paper Co., Bristol, Pa.

This unit consists of the conventional sheets made up of (1) outer wrapper of wet-strength, grease-resisting parchment printed with packers' name and design; (2) middle sheet of absorbent paper; and (3) inner grease-resisting barrier.

These sheets are collated and bound together with adhesive on one side to form a single unit.

Advantages cited in this new combination unit are the increased speed in packaging and simplification of inventory and stocking problems.

For Package Data Use Reader Service

Syrups In Novel Pack

A unique method of merchandising syrups used for hot weather drinks has been adopted by Lincoln Foods, Inc., Lawrence, Mass., on 5 of its items.

The company's orange, fruit punch, raspberry, grape, and lemon-lime fruit syrups are being bottled in 1-pt. Lincoln glass bottles.

The unusual design of the bottle makes it an eye-appealing display item, and the handy slot for coins provided in the screw-type metal closure gives it a re-use value as a "bank".

Bottles are furnished by Owens-Illinois Glass Co., Toledo, closures by Bernardin Bottle Cap Co., Inc., Evansville, Ind., and labels by Dennison Mfg. Co., Framingham, Mass.

For Package Data Use Reader Service

Variety In One Unit

Two special confection packs, designed by E. I. Du Pont de Nemours & Co., Wilmington, Del., were shown at the recent National Confectioners'

Assn. show in Chicago. They are designed specifically for families who want variety along with ease of handling, particularly on picnics and motor trips.

The "Picknicker" is a combination pack of carmel-coated corn and marshmallows. The corn is in a cellophane bag and the marshmallows in a polyethylene bag, the two being held together by a paper handle.

The "Family Assortment" tray is a multiple package of different candies—a peanut bar with a laminated acetate label, a miniature box of chocolates packaged in acetate film, a bundle of lollypops in a cellophane pack, and a polyethylene bag of hard candies. The tray is overwrapped in cellophane.

For Package Data Use Reader Service

Carry-Home In Plastic

A six-bottle plastic carry-home container is now available to Coca-Cola customers in Oklahoma City and Tulsa, Okla.

Molded of Celanese acetate, it is in bright red with the familiar Coca-Cola trademark hot-die stamped in white. This is applied at sufficient pressure and heat to create a debossed lettering effect, adding to the eye appeal of the carrier.

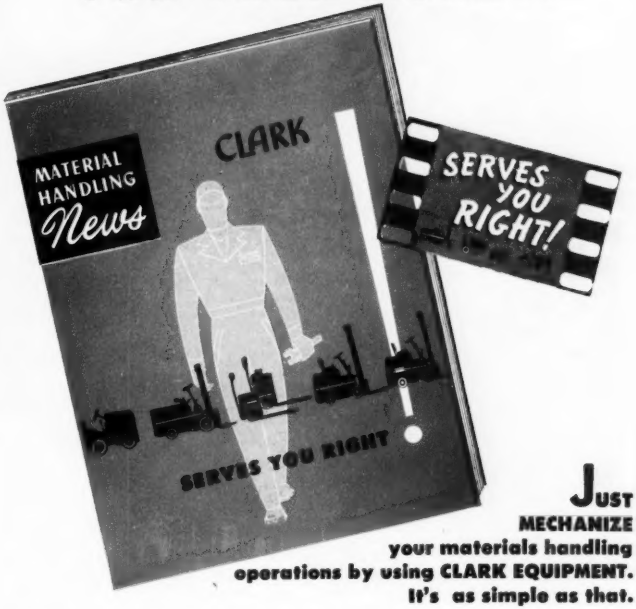
The only non-plastic part is the rustproof, retractable metal handle. Side walls, bottom wall, and integral dividers are all of molded plastic.

The bottom wall of the container is constructed with a rectangular flushing opening and four round drainage holes in each compartment to facilitate cleaning prior to re-use. The flushing aperture permits riddance from the carrier of bottle caps or other waste material collected in it.

Celanese acetate, a product of Celanese Corp. of America, New York City, is used by Durable Plastics, Inc., Sherman, Tex., in making the carriers, which are trade-named "Plasti-Cel."

For Package Data Use Reader Service

HOW TO GET THE MOST FOR YOUR MONEY!



JUST MECHANIZE your materials handling operations by using CLARK EQUIPMENT. It's as simple as that.

● That's what they all say? Perhaps. But CLARK backs up *its* claim with facts and unmatched performance.

On the questions of . . .
√ **Quality, Longevity**
√ **Savings Achieved**
√ **Customer Satisfaction**
√ **Number of Trucks in Use**
√ **Efficiency and Performance**
√ **Economy of Operation and Maintenance**
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. . . there is at hand—and available to you—overwhelming evidence that CLARK Serves You Right!

The whys and wherefores are available to you in two new media—the "SERVES YOU RIGHT" edition of our Material Handling News, and our new movie on the use of fork-lift trucks and industrial towing tractors in Plant Maintenance Work.

Each of these items is free to you—the 15-minute sound movie, black-and-white, on a loan basis. They'll tell you and show you how CLARK enables you to get the *MOST* for your money. Just fill out the coupon, attach to your business letterhead and place in your "outgoing" mail basket.

CLARK ELECTRIC AND GAS POWERED FORK TRUCKS
AND POWERED HAND TRUCKS • INDUSTRIAL TOWING TRACTORS

INDUSTRIAL TRUCK DIVISION • CLARK EQUIPMENT COMPANY • BATTLE CREEK 14, MICHIGAN
Please send: ☐ Material Handling News ☐ Movie "Serves You Right" ☐ Have Representative Call.

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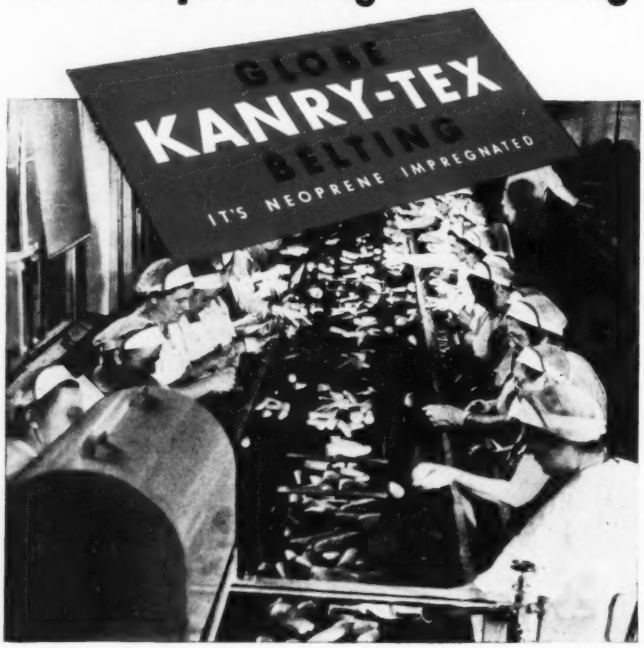
DISTRIBUTED FROM INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

removes risk of contamination in food processing and canning



• Juices, acids, alkalies, fats, oils . . . *all liquids* remain on the surface of solid woven Globe Kanry-Tex Belting. Neoprene latex impregnation of all fibres and voids *locks them out!*

Odors and flavors are not picked up nor imparted. Neoprene latex impregnation stands guard against them!

There you have two BIG reasons why fruits and vegetables conveyed with non-absorbent Kanry-Tex are not contaminated en route . . . why sorting and inspection are accomplished without adding "foreign" taste.

But there are other reasons — all just as important to food processing, canning and dehydrating plants — why Neoprene latex-impregnated Kanry-Tex is the most satisfactory of all belting. It may be washed and sterilized with hot water or live steam. Age won't deteriorate it — fibres are rot-free. There are no plies to separate. It's a solid woven carcass. It's tough, lasts longer, thereby reduces belting costs and downtime for change-over. Extremely flexible, it can be run over small pulleys. It permits slitting and trimming to narrower widths with clean-cut, unfrayed edges.

Prove it to yourself with free samples and literature. Write Dept. F today for samples, literature, prices and the names of local distributors.

GLOBE

WOVEN BELTING CO., INC.

1400 CLINTON ST., BUFFALO 6, N. Y.

Swift Syrup Chilling

—*Continued from page 125*

cooling-water arrangement was designed whereby city water only, or various combinations of city and chilled coolant, could be used. The piping was arranged to permit:

1. Use of city water in first pass only and chilled water in second and third passes,
2. Use of city water in first and second passes and chilled in third, or
3. Use of city water in all three passes.

The refrigerating unit for chilling the cooling water consists of a Chrysler 7-H, 40 hp., 30-ton radial compressor with full unloading facilities. It's designed to cool 40 gpm. of water from 65 to 50 deg. F. using a Doyle & Roth water chiller (12 in. x 10 ft., insulated with 2 in. of cork).

Operations of blending the refrigerated and the city water, switching the compressor on and off, and preventing the system from freezing are all controlled automatically. The number of chilled water passes on the cooler, however, is regulated by hand. *End* (Resume reading on page 127)

Freezing Hazard

—*Continued from page 76*

the horizontal lines, temperature on the vertical lines, of the 30-day continuous-record chart.

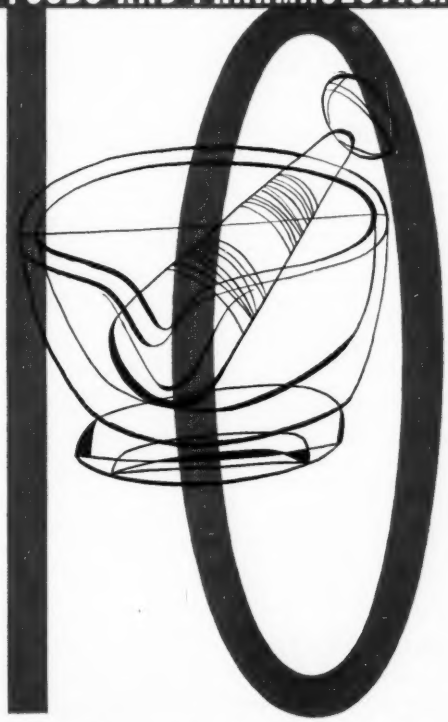
Since government-owned meat, as well as the company's products, are stored in the cold-rooms, this type month-long chart not only satisfies the government temperature-record requirements, but does so economically.

There is no need now for the disagreeable, as well as costly, task of continuously touring the rooms to check and record temperatures. In fact, entrance to the rooms is now limited to in-and-out movement of product.

What's more, it is no longer necessary for a checker to open doors to the refrigerated rooms throughout the night. Therefore, they are kept locked, except during the hours when products are scheduled for loading into, or withdrawal from, storage. Thus, instrument recording reduces the refrigeration load.

Another function of the multi-recorder is to turn on a red light in the corridor which is patrolled by the night watchman, if storage-room temperature rises above a safe minimum. This is a reverse application to that of the radiant-heat control instrument which turns off a green lamp if the

FOR FOODS AND PHARMACEUTICALS



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Deming "MOTOR-MOUNT" Condensation Return Units (above and at right). Single and Duplex units for 2,000 to 40,000 sq. ft. of radiation.

Deming Fig. 4958 Centrifugal Jet Units (below) for 500 to 10,000 sq. ft. of radiation.

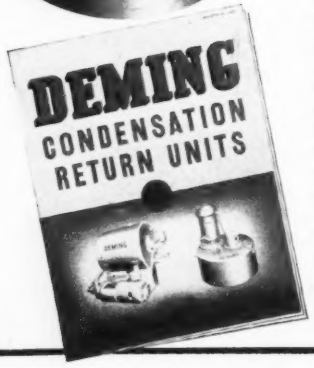
● These modern, efficient "fuel-savers" return the condensate from steam coils, radiators, or steam operated equipment back to the boiler.

Deming "Motor-Mount" centrifugal pumps are used on Deming "Motor-Mount" Condensation Return Units. Pump motors have standard "NEMA" type "C" mounting flange and are furnished for single phase, two or three phase or for direct current, as specified.

"Motor-Mount" pumps are equipped with enclosed type bronze impeller and stainless steel pump shaft. Deep stuffing box is provided with conventional packing rings for grease lubrication.

Deming Fig. 4958 "Hotshot" Condensation Return Units are equipped with a centrifugal jet pump. Entire pumping unit and jet can be removed for cleaning without disturbing any of the piping.

Ask your Deming Distributor or write us for illustrated Bulletin No. 4400 which includes performance tables to simplify selection of proper unit to meet specific requirements.



THE DEMING COMPANY
556 Broadway • Salem, Ohio

sub-floor temperature falls slightly below that at which radiant heating is applied.

It is possible that the green light may not be turned off even though controls turn on radiant heating. For the latter is so rapid and effective that the slight further drop to the warning temperature may not be reached.

End (Resume reading on page 77)

Fastest Quart Line

—Continued from page 89

sprayed on the inside with a phenolic resin, which was then baked to give it a corrosion-resistant, glossy enamel finish.

Deaerated water is then metered into the pre-mix unit. Next, the mix goes to the Carbo-Cooler—the combination cooling and carbonating unit. The pre-mix is then fed to the filler.

High-Speed Filler

Pace-setter on the new quart line is the 60-spout rotary filler. Here, empty bottles coming from the cleaner are transferred to stirrups by a positive-centering star. Bottles are then elevated into a fixed, locked position against rubber sealing valves.

Immediately after sealing, counter pressure is admitted into the bottles through vent tubes. This pressure charges the bottle and limits the filling height. Now, the beverage flows from the filler bowl, past the valves, and into the bottles. Flow is evenly distributed down the inner wall of the bottles.

From the filler, the bottles are conveyed to the 10-head rotary crowner. The two units are connected with a single drive so that their timing is the same.

Labeling and Casing

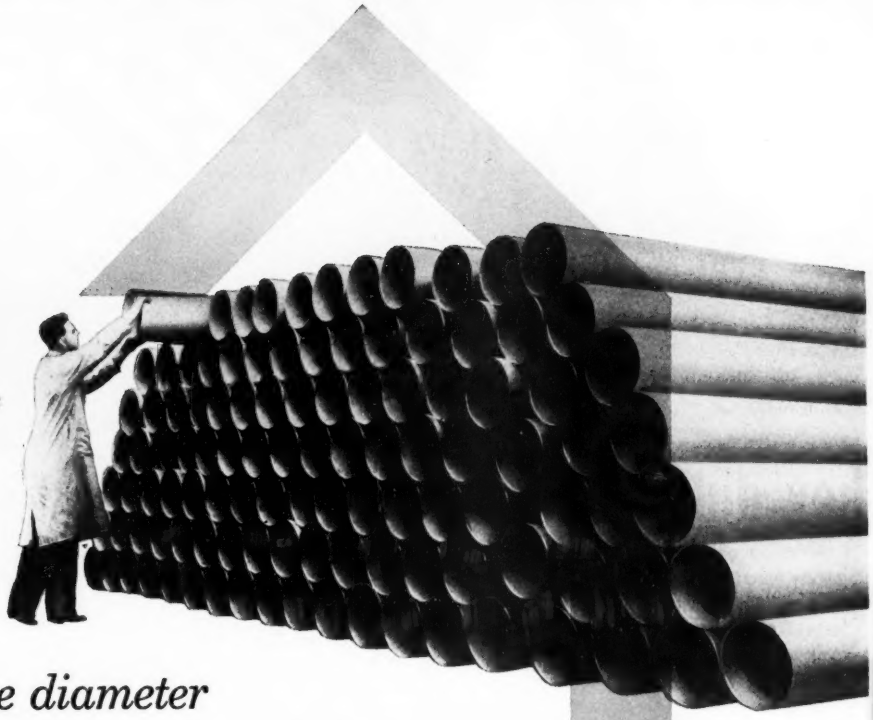
Capped bottles are now ready for labeling. As the bottles advance to an in-feed device, they are automatically distributed into rows feeding four tandem labelers.

The conveyor and each labeler are equipped with variable-speed drives. As a result, labelers can handle bottles at speeds up to 80 per min. and in a steady or interrupted flow.

Each labeler operates at a speed of 60 bottles per min. And in the event of a break-down of a machine, or any other shutdown, speed of the other three units can be increased to handle the full 240-per-min. output.

Finally, labeled bottles go to a 4-lane, 3-deep case packer that automatically loads 12 qt. into each case.

End (Resume reading on page 90)



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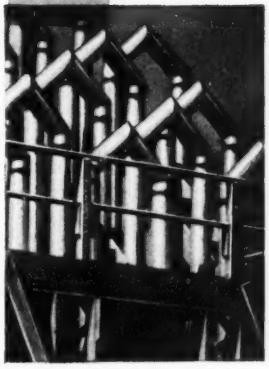

CONDENSING LOOPS FOR HANDLING MERCURY VAPOR AT A WESTERN MINE. FABRICATED OF CR-NI STAINLESS STEEL.

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what

He turned to Westinghouse engineers for help on the electrical apparatus. He asked for a method, an operating proposal—not just a quotation on apparatus. His staff and ours worked out a system for power generation, distribution and utilization including integrated drives for the centrifugals. This is a system of many devices. Result . . . automatic operation increased over-all efficiency, reduced manpower requirements; stand-by problems were eliminated; valuable factory space was conserved through removal of belts and pulleys; maintenance became negligible.

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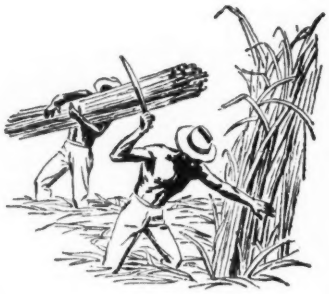

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ADVANCES IN TECHNOLOGY

Device That Proportions and Mixes Liquids Responds To Variations in Primary Flow

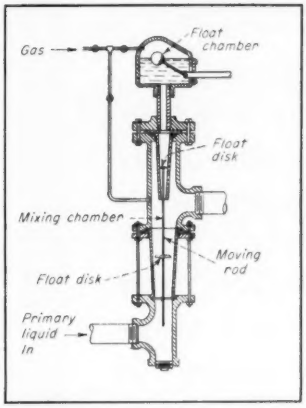
A fluid proportioning device utilizing a common type of rate-of-flow meter in the primary liquid line as a means for proportioning a secondary liquid into the primary fluid is the object of a recent patent.

There is but one moving part in the device—a rod or stem, carrying float disks near its ends, which rises and falls according to the rate of flow of primary liquid (see drawing).

The device comprises a mixing chamber into which two vertical conduits discharge, the one for the primary fluid from below and that for the secondary from above. Discharge end of former flares upwardly, and that of latter tapers downwardly.

A float disk in the primary fluid line forms an annular constriction with its wall, and rises or falls according to rate of flow. Stem of float extends upwardly into tapered bore of secondary fluid discharge line and carries a disk which forms an annular constriction in it.

In operation, the primary liquid flows upwardly into the mixing chamber and the secondary liquid flows downwardly under a constant pressure head. Primary liquid passes through annular constriction between float and



bore of tube. Rate of flow determines position of float. Disk at upper end of stem moves with lower float, and restricts flow of secondary liquid. Thus a constant proportion is maintained between the two liquids despite any variation in rate of flow of primary liquid.

Digest from U. S. Patent 2,592,304, issued April 8, 1952, on an application dated Aug. 18, 1945, to A. J. Lubeley, assigned to Anheuser-Busch, Inc., St. Louis, Mo.

Novel Homogenizing Unit Employs New Principle

An improved apparatus for homogenizing dispersions such as milk, by forcing them through a set of juxtaposed balls, is covered by a patented invention.

Liquid is forced through an opening formed by a set of three balls arranged in the same plane, whereupon it enters a whirl chamber formed by these balls and another one in the next plane. Frictional losses are small, most of the energy applied can be used to create turbulence.

Arrangement of balls which best satisfies the objective is that in which they occupy minimum volume. They are then in contact at the largest number of points; the passageways between them will all be alike, and will have the smallest possible through-flow area in relation to ball diameter. A container in the form of a tetrahedron will dispose the balls in the most satisfactory arrangement. By using a pump pressure of 15 kg. it is possible to homogenize whole milk to a degree which requires a pressure of 100 to 200 kg. in standard homogenizers.

Digest from U. S. Patent 2,583,206, issued Jan. 22, 1952, on an application dated Nov. 3, 1950, to A. G. Borck, Tullinge, Germany, and Carl Gronning, Stockholm, Sweden, assigned to Aktiebolaget Separator, Stockholm, Sweden.

Obtaining Bacteria-Free Air

To be acceptable for purification of air for large food or fermentation plants, glass wool or slag wool filters must be 100 percent efficient in removal of microorganisms larger than 0.5-1.0 microns in size.

Test methods for filters of this type should use a tracer organism of about this size and of distinctive colony form that may be readily distinguished from accidental contaminations.

By spraying cultures of *Staphylococcus albus* into air streams ahead of such filters it has been shown that slag wool units will remove 99.86-100 percent of the bacteria from air that prior to filtration contained 30 to 1,200 bacteria in 2 cu. ft. Filter material should have a uniform density of 25 ± 2 lb. per cu. ft., especially when the units must have considerable area in order to keep the air velocity down to no more than 0.5 ft. per sec. calculated on the empty filter.

Slag wool slabs can be sterilized by heating to 320-356 F. for 2 hr. Their efficiency on air samples of 1 million cu. ft. or so can also be tested by blowing the filtered air through a fermenter of sterile but uninoculated medium, and then plating it.

Digest from "The Removal of Bacteria from Air by Filtration: Application to Industrial-Scale Fermentations" by G. B. Cherry, E. P. McCann, and Alan Parker, *Journal of Applied Chemistry*, Vol. 1, Suppl. Issue 2, S103-7.

New Barley Drying Silo

Drying of combine-harvested barley for malting to 12 percent moisture is particularly important. However, improper drying can damage the germinative power.

A silo 60x10x10 ft. was designed to hold 5,800 bu. of barley, and to receive a current of air dried with silica gel during the summer or heated to 90-95 F. in winter. Air was dis-

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tributed through the barley by means of cruciform distributors placed at 10-ft. intervals in the silo.

To follow the flow of grain in its movements through the silo, shredded colored paper was added during filling. Moisture was reduced from 18-19 to 11-12 percent in 6 days without injury to the barley's malting capacity. Thermal efficiency of the unit was about 30 percent and the operating cost about 9¢ per cwt. or 3½¢ a bu.

Digest from "New Method of Sweating Barley in Bulk," by Alan Macey, *Journal of the Institute of Brewing*, Vol. 58, No. 1, 25-35, 1952.

BAKING

Makes Coffee Rings

In a recently patented coffee ring making machine a rotary knife cuts a sheet of dough into longitudinal strips which are fed by a belt to the open end of an inclined rotating cylinder. Inside wall of the cylinder is equipped with spiral ribs or similar deflections, and its rpm. is regulated to give the desired twist to the strip of dough.

Emerging from the cylinder, the twisted dough-piece is transferred to the top of arcuate trap doors, carried by a rotary platform, where the piece is formed into a ring by the action of a series of vertical spools maintained in constant rotation. Then the trap doors open and drop the ring onto a conveyor where it may be sprayed with egg wash preparatory to depositing nuts thereon and transferring to an oven.

Digest from U. S. Patent 2,591,546, issued April 1, 1952, on an application dated July 18, 1946, to Charles Hettinger, West Englewood, N. J.

DAIRY

Crystals In Evaporated Milk

When 300 cans (14.5-oz.) of crystal-bearing evaporated milk were examined, the average weight of calcium citrate crystals found was 0.426g. per can. But attempts to correlate the occurrence of these crystals with factors that might influence their formation were mostly negative.

Maximum crystal development occurred during storage from 4-20 months, and often did not continue beyond 2 yr. In several batches growth was retarded by storage at low temperatures and by addition of disodium phosphate. Conditions usually favorable for growth of crystals were storage at temperatures above 60 F., and direct addition of calcium chloride and citric acid solutions to the milk before sterilization.

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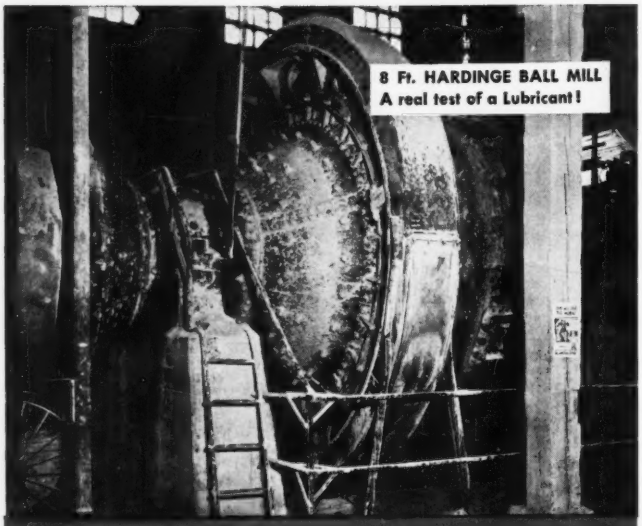

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In addition to these observations, a study was made of the possible effect of the stage of lactation on the growth of crystals, using milk from cows in early, middle, and late stages. Effect of agitation of cans was studied; and four samples were analyzed to see whether the salt composition of the milk bore a relationship to salt crystallization during storage. Finally, the effect of the pH or the viscosity of the milk was investigated. Occurrence of crystals could not be correlated with any of these factors.

Digest from "Factors That Affect the Formation of a Crystalline Deposit in Evaporated Milk," by E. F. Deysher and B. H. Webb, *Journal of Dairy Science*, 106-115, Feb. 1952.

Effect of Storage Temperatures On Stability of Frozen Milks

To prevent early development of flakiness, frozen milk and its concentrates should be stored at a temperature of −10 F. or below. And concentration should not exceed 3½:1, or 45 percent total solids.

Experiments were conducted to determine effects of different storage temperatures on the body and flavor stability of frozen pasteurized, homogenized whole milk, and 2:1, 3:1, and 4:1 concentrates. Samples were frozen in sealed cans at 0 F. and stored at −35, −17, −8, +1, and +10 F., then removed at intervals, tempered overnight at +35 F., warmed to 70 F. and examined for body and flavor.

Neither +1 nor −8 F. were cold enough to prevent deterioration in body of the milks before the end of 12 wk. All concentrates except 4:1 had satisfactory bodies after 12 wk. at −17, and 3:1 concentrates showed no physical deterioration after 6 mo. at −17 and −35 F.

After 12 wk. at +1, the unconcentrated milk had developed a slight oxidized flavor, and after 19 wk. at −8 it, and the 2:1 concentrate, were strongly oxidized. In no instance did an oxidized flavor develop in the 3:1 or 4:1 concentrate samples.

Digest from "Stability of Milk and Its Concentrates in Frozen Storage at Various Temperatures," by R. W. Bell and T. J. Mucha, *Journal of Dairy Science*, 1-5, Jan. 1952.

New Forewarming Procedure Improves Evaporated Milk

Sterilized milk that is lighter in color than the normal product, yet has good fat stability in the can, has been produced experimentally using an improved forewarming process.

Employed is a steam jet assembly installed in the line between milk pump and hot well, and a spring-loaded valve near the outlet of the

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line. With this assembly, cold raw milk was heated to approximately 210 F. by injection of steam as the milk was pumped to the hot well under back pressure produced by the spring-loaded valve.

Milk was held in the hot well less than 5 min., then concentrated, homogenized at 2,500 psi. at 130-140 F., cooled to 40 F., standardized, canned and sterilized at 250-260 F. for 3-18 min.

Best stability was obtained with steam pressures of 60-95 psi., and back pressure of 20 lb. Lighter color resulted from sterilization at 253-260 F. for 3-5 min.

Digest from "The Heat Stability of Evaporated Milk as a Function of the Steam and Hydrostatic Pressure Applied in the Forewarming of Milk," by V. Nelson, *Journal of Dairy Science*, 388-92, May 1952.

FRUITS AND VEGETABLES

Salinity of Soil Causes Tip-Burn In Greenhouse Vegetables

Tip-burn, which can result is severe damage to leaves of vegetables, especially lettuce and tomatoes grown in glasshouses, results from an excess of salts in the soil.

Electrical conductivity of soils is increased by application of large amounts of mixed fertilizers, and the pC value (negative logarithm of the specific conductivity) is a measure of it. Damage to lettuce occurs when the pC of the soil falls below 3. Tomatoes tolerate greater salinity, and produce good yields at levels of 2.65-2.80.

A simple device can be used for detecting soils unsuitable for growing lettuce. Damp soil is tamped into the space between 2 electrodes, and a 240 v. a.c. potential is applied. Time required for a current of 8 amp. to build up between the electrodes is then determined. Soils taking longer then 3¾ min. are satisfactory, less than 3 min. are not.

Digest from "Damage to Glasshouse Crops by Over-Manuring," and "The Rapid Detection of High Salt Concentrations in Soils Likely to Damage Lettuce Plants," by J. Grainger, *Journal of the Science of Food and Agriculture*, Vol. 3, No. 4, 164-75, 1952.

Machine Imparts Round Shape To Fruits and Vegetables

Meaty portions of vegetables and fruits can be formed into round or ball-shaped pieces by means of a machine of patented construction.

The device consists of two vertical concentric drums, the outer one stationary and the inner one adapted to be rotated by a central driving shaft. The annular space between them

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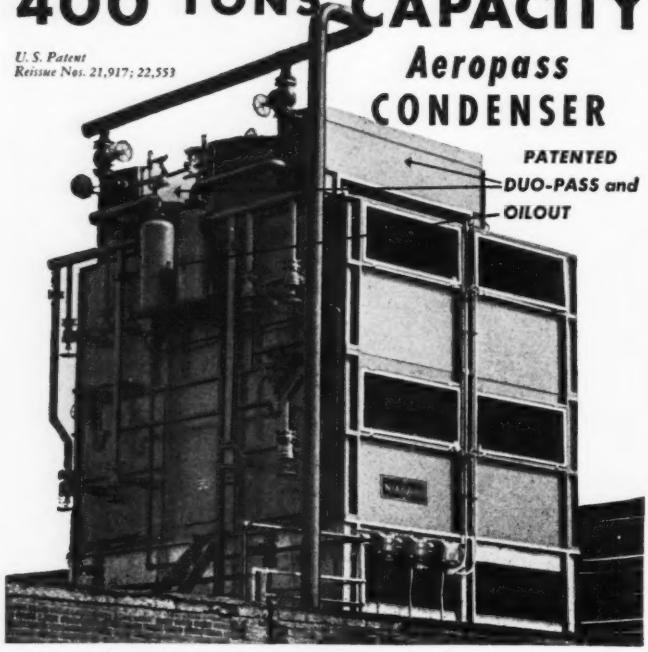
U. S. Patent Reissue Nos. 21,917; 22,553

Aeropass CONDENSER

PATENTED DUO-PASS and OILOUT



YOU USE LESS POWER...
SAVE CONDENSER WATER...
SAVE UPKEEP COST

For large refrigeration systems, NIAGARA gives you a choice between a battery of condensers (that may be cut on or off with the load) or a high capacity condenser that saves space.

Both have the patented "Duo-Pass" and "Oilout" that remove superheat and keep the system free of oil. Results: you save one-third or more of power cost and upkeep expense. Niagara Patented Balanced Wet Bulb Control gives lowest head pressure operation automatically. *Write for Bulletin 111.*

NIAGARA BLOWER COMPANY

Over 35 Years' Service in Industrial Air Engineering

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Field Engineers in Principal Cities of U. S. and Canada

forms a grinding chamber. Wall of the inner drum is recessed at spaced intervals so as to divide it equally into upper, middle, and lower portions. Upper portion is provided with ribs of half-round material extending spirally around the drum at a relatively low angle with the horizontal. The middle and lower portions are provided with similar ribs extending horizontally around the drum. They also have a series of short ribs that aid in guiding the food pieces through the machine. Outer surface of inner drum and inner surface of outer drums are preferably coated with an abrasive material.

Products to be rounded are fed into the space between the two drums and are caused to travel downwardly by the ribs attached to the inner rotating drum. As the pieces descend, their irregular corners are progressively removed by tumbling and abrading until they are eventually discharged from the grinding chamber at the lower end of the drums. A stream of wash water aids in the travel of the food pieces, and serves to wash away the waste material caused by the grinding.

Digest from U. S. Patent 2,572,262, issued Oct. 23, 1951, on an application dated Oct. 10, 1946, to S. M. Hibbard, Macedon, N. Y., assigned to Canning Machinery Inc., Rochester, N. Y.

SANITATION

Test Gives HCN Concentration In Area After Fumigation

Fumigation with hydrogen cyanide requires a highly sensitive method for detecting and estimating low concentrations of the fumigant in air.

In the United Kingdom, regulations under the Fumigation Act of 1937 forbid entry into an area where concentration of HCN exceeds 1 part in 100,000. The Sieverts and Hermsdorf test is often used for estimating the safety of an area after HCN fumigation. A strip of filter paper is dipped into a fresh mixture of benzidine acetate and copper acetate solutions and then waved in the atmosphere. Depth of blue color that forms on the paper is a measure of the HCN concentration. The method of carrying out the test has been carefully standardized and laid down in the new regulations. Test solutions shall not be more than 31 days old, and $\frac{1}{2}$ of the width of the 6 x $\frac{3}{4}$ in. paper strip is printed in a blue color corresponding to that produced in 10 sec. by an HCN concentration of 1 in 100,000.

To perform the test, one of the strips is dipped in test solution and

West Carrollton GENUINE VEGETABLE Parchment

Gives Good Protection, too!

Fine foods deserve the *best* flavor-protection that packaging can provide. That is why so many packers of moist foods use so much West Carrollton Genuine Vegetable Parchment, year after year—thereby winning quicker and more lasting public acceptance. This parchment is ODORLESS, TASTELESS, GREASE-RESISTANT, INSOLUBLE and is STRONG, too, wet or dry. We can print it for you in one or more attractive colors (special inks)—right to your specifications.

DRY WAXED PARCHMENT
BUTTER WRAPPERS
BUTTER TUB LINERS & CIRCLES
BUTTER BOX LINERS

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LARD CARTON LINERS
MILK & ICE CREAM CAN TOPS
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VEGETABLE SHORTENING CARTON LINERS
CELERY WRAPPERS
OLEOMARGARINE WRAPPERS
MEAT WRAPPERS

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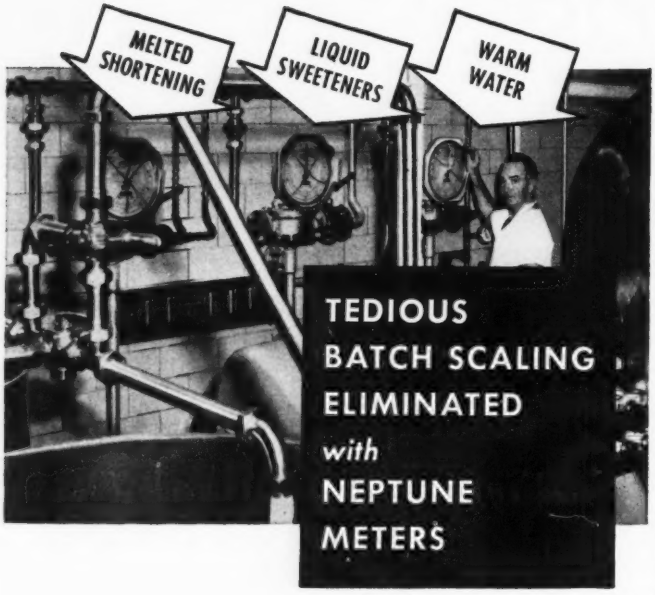
LINERS FOR MEAT TINS
POULTRY WRAPPERS
CHEESE WRAPPERS
TAMALE WRAPPERS
MANY OTHERS

WEST CARROLLTON PARCHMENT COMPANY • WEST CARROLLTON, OHIO

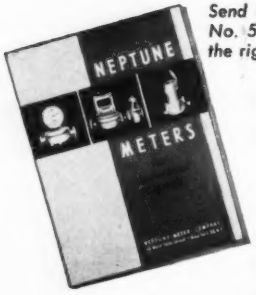
For more information, use post card on last page.



With this ingenious homogenizing system, First National Stores, Inc. pre-mixes salt, sugar, milk, shortening and water into an emulsion that can be pumped easily to their bread mixers. These pre-mixed batches are big, working from whole bags or drums of dry ingredients, with Neptune Auto-Stop meters automatically, accurately delivering the right amount of water, melted shortening and liquid sugar to the pre-mix tanks.

The system eliminates tedious batch scaling, produces more uniform quality by eliminating human errors, saves ingredients that adhere to scaling buckets, tightens up on inventory control, and saves time lost in cleaning up.

Start you thinking? Let your imagination tour your plant. Aren't there several spots where accurate liquid metering can speed up batch mixing, simplify processing control, wipe out spoilage or spillage, or keep tabs on liquid inventories and costs? Ask our field engineers for ideas—put over 60 years of experience with more than ten million meters to work for you.



Send for new Industrial Meter Bulletin No. 566-NF — it shows how to select the right meter for your process.

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waved gently in the air for 10 sec. Its color is then compared with the printed half of the strip. A deeper shade of blue indicates more than 1: 100,000 of HCN, a paler shade less than 1: 100,000.

Digest from "The Benzidine Acetate—Copper Acetate Test for Hydrogen Cyanide", by W. Burns Brown, *Chemistry and Industry*, 124-26, Feb. 9, 1952.

FISH AND MEAT

Recovery of Salable Oil From Salmon Waste

Alkali digestion of pink-salmon cannery waste followed by centrifuging yields economic quantities of salable oil containing moderate amounts of vitamin A.

This had been previously demonstrated, but was verified in experiments conducted to secure additional data on effects of varying the digestion conditions.

Tests were run at 180, 200, and 240 F. with 1.5 parts NaOH per 100 parts waste, and at 200 F. with 3 parts alkali. Waste was collected in wire baskets from end of flume coming from butchering and cleaning operations at a Ketchikan cannery. It was put through a meat-bone chopper and added to an equal weight of 180 F. water, in which the alkali was dissolved, then steam-heated to the desired digestion temperature in a period of 10-min.

After processing, the mixture was allowed to settle 15 min., then the oil-rich top layer was skimmed off and passed through a preheated centrifugal oil purifier. Remaining liquor was passed through a 12-mesh sieve before centrifuging.

Most satisfactory recovery (6-6.5 lb. oil per 100 lb. waste) was obtained by digesting with 1.5 parts NaOH for 25-30 min. at 200 F.

Digest from "Technical Note No. 14—A Brief Study of the Alkali Process for Recovery of Oil From Pink Salmon Cannery Waste," *Commercial Fisheries Review* (Technical Supplement), 39-43, Nov. 1951.

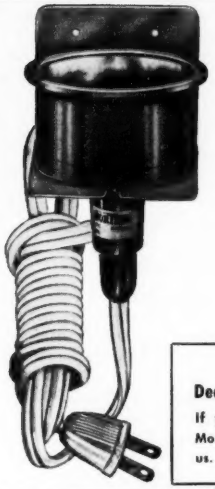
Deterioration in Frozen Meat

Meat freezing requires the formation of ice from water in the system containing proteins, salts, and fats. Drip, the loss of fluid when frozen meat is thawed, depends on the pH of the meat before freezing (the lower the pH the more drip), the osmotic pressure of the meat, and the nature of the muscles involved.

Rate of freezing and thawing, and the age, sex, and breed of the animal are not factors. Freezer burn is due to sublimation of ice from the surface of frozen carcasses, with a consequent

AMAZING NEW VAPORIZER KILLS INSECTS INSTANTLY!

At Last! Complete Protection From Insects!



MORTRON VAPORIZER

$6.95 per unit complete with cord, wall bracket and liberal supply of Mortane crystals

Additional units of Mortane Crystals — 50 cents each.

Actual size 4½" x 2½"

ATTENTION
Dealers! Jobbers! Distributors!
If you are interested in representing Mortron in your area, please contact us. There are still a few open markets.

MANUFACTURERS, RETAILERS, FARMERS ACCLAIM AMAZING UNIT

It's the same thrilling story everywhere — amazing reports of the effectiveness of the Mortron Vaporizer. Manufacturers, retailers, farmers, proprietors — in every line of business acclaim wonderful freedom and protection from flying pests.

"Kept our barn free of flies and mosquitos"

"Made shopping a pleasure"

"Did away with bothersome fly nets over our baked goods"

Don't risk losing good will among your customers or endanger the profitable operation of your business and the productive capacity of your employees. **Here is a partial list of establishments for which the Mortron Vaporizer has been designed: breweries, distilleries, ice cream plants, poultry houses, confectioners, grain and feed mills, kennels, printing plants, bakeries, canneries, grocery and food stores, packing houses, restaurants, hotels, theatres, public restrooms, bottling plants, dairies, paper mills, soda fountains, taverns.**

MORTANE FOUR TIMES MORE POWERFUL THAN DDT

The Mortron Vaporizer vaporizes a crystallized chemical called Mortane. It was discovered in Europe in 1939 and is considered four times more powerful than DDT. Never before has there been anything so powerful, yet so safe and so protective. While it means sure, instant death to insects, it is perfectly safe for humans, foods, livestock, plants and pets.

CHECK THESE FEATURES!

- No servicing required
- Operates electrically for pennies a month
- Weighs only 7 ounces
- Safe! — Underwriter's Laboratories Label
- Guaranteed for 10 years
- Single unit effectively covers a 40 x 50 x 10 room
- Safe, odorless, inconspicuous
- Lowest priced vaporizer of its kind
- Comes in ivory or black colored plastic
- Money back guarantee

SENSATIONAL DISCOVERY PROTECTS FOOD, CUSTOMERS, EMPLOYEES FROM ALL FLYING PESTS

SILENT! ODORLESS! COLORLESS!

Now at last you can rid your office, store, factory, barn, restroom, warehouse, in fact any room, of flies, bugs, mosquitos, gnats, and roaches. Now at last you can protect foods from disease-bearing pests — protect employees from annoying interruptions — protect customers from these flying nuisances.

Just plug the unit in any electrical outlet. Within seconds this miracle discovery starts to work, vaporizing a crystallized chemical called Mortane that is four times more powerful than DDT . . . that means sure, instant death to insects . . . yet is perfectly safe for humans, food, plants, livestock and pets.

Never before has there been anything so safe, so protective, . . . so powerful. Best of all, no servicing is required, other than to refill the vaporizer with Mortane when empty.

Don't suffer another moment with old fashioned hit or miss methods, fly swatters, costly and messy spray guns. Be guided by the thrilling experiences of countless manufacturers, retailers, farmers, and proprietors all over the country who acclaim the Mortron for the amazingly quick, efficient, economical way it kills flying insects. You have everything to gain for the Mortron Vaporizer is sold with a money back guarantee.

Works Automatically — Out of Sight

Unlike most vaporizers, the Mortron is a compact unit, so small it fits in the palm of your hand. It operates electrically on only 6 watts of current and is completely effective up to 10,000 cu. ft. — approximately a 40 x 50 x 10 room. It works silently, odorlessly, inconspicuously and requires no servicing other than to refill the vaporizer cup with Mortane Crystals when empty.

Weighs Less Than 7 Ounces

You'll be thrilled with the speed and effectiveness of this miracle unit. It starts to work the instant you plug it in. Within seconds the vaporization of the crystals affects flying insects; gives you immediate relief from annoying, disease-bearing flies, bugs and mosquitos.

Best of all, the Mortron is so inexpensive to use. Electric costs run pennies a month.

LABORATORY TESTS PROVE "INSTANT DEATH TO INSECTS"

Laboratory tests prove how effective the Mortron Vaporizer really is. Here are the results as reported by a leading testing company:—

"After 7 minutes, 80 to 90% of the insects in the room were dead.

After a 9 minute run, they were all dead."

Incredible but true. Never before has it been possible for you to enjoy such complete, continuous protection from pesty flies and other annoying insects. And at the same time, give your customers and employees wonderful protection.

But only your experience counts. Try the Mortron Vaporizer at our expense. If it doesn't do everything we claim, return it in 7 days and get your money back.

MAIL COUPON TODAY! MONEY-BACK GUARANTEE!

EXTERMINATOR CORP. OF AMERICA DEPT. 15
15 S. 21st St., Phila. 3, Pa.

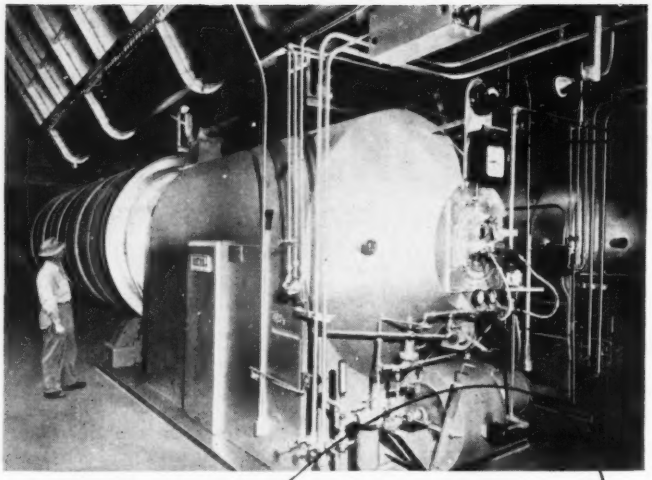
Gentlemen: Enclosed please find $6.95 for a Mortron Vaporizer. It is my understanding that if I am not satisfied, I can return the Mortron Vaporizer in 7 days and receive my money back.

NAME .....

ADDRESS .....

COMPANY .....

CITY ..... Zone ..... State .....



Up goes quality, Down go costs

LET Cyclo-Matic Drying help you

Step up quality of output

. . . yours only in

ARDRIER DEHYDRATORS

With Cyclo-Matic Drying, it costs less to get highest quality output—relatively cool, due to rapid moisture evaporation, short retention time in drum. Perishable vitamins and nutrients are preserved—only moisture is removed. Outlet temperature and moisture content are thermostatically controlled. No boiler is required — heat exchanger losses are eliminated.

Ardrier Dehydrators save you money on original cost — on installation, operating, and maintenance costs, also. Capacities, 2,000 — 12,000 lbs. of water evaporated per hour.

Find out more about how Ardrier's exclusive 3-pass drum and showering flight design can lower your per-ton drying costs. Send coupon for bulletin.

Ardrier Dehydrators are manufactured by The Heil Co.

Arnold Dehydrators are successfully drying:

Citrus peel • Tomato pomace • Leafy vegetable wastes • Fish meal • Beet pulp • Sweet potatoes Spent grains

. . . and many other packing-house, canning-company, and food-processing wastes

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Send me Ardrier Dehydrator bulletins.

Name.....Position.....

Company.....

Company Address.....

City.....(.....) State.....

ADC-8A

drying-out of the tissues. The unsightly grayish-yellow appearance of the carcasses caused by freezer burn is irreversible.

Discoloration of frozen meats is due to the effects of high concentrations of salts (chlorides and phosphates) on the pigment oxymyoglobin, gradually changing it to metmyoglobin. Even at −4 F. fatty tissues can take up oxygen to form peroxides, which lead to oxidative rancidity on thawing.

Fats can also absorb odors even at +14 F. and must therefore be kept from odoriferous substances in storage. The effect is reversible, however, and the odors are lost in a short time on storage in clean air.

Digest from "Frozen Meat," by E. H. Callow, *Journal of the Science of Food and Agriculture*, 145-50, April 1952.

CONTROL METHODS

Estimation of Vitamin A

The spectrophotometric method is the most reliable procedure for assaying margarine for vitamin A following fortification with high quality concentrates. It is more precise and less time consuming than the bio-assay (official method for determining vitamin A in margarine).

In a collaborative study, (by 3 independent laboratories) 5 vitamin concentrates of 2 different types (each containing about 200,000 units per gram) were assayed by physico-chemical methods and by multiple level biological assays.

Results showed that a precise estimate of vitamin A potency can be obtained by spectrophotometric assays of the whole oil, or by colorimetric tests ($SbCl_3$) of the unsaponifiable extract. Good agreement was obtained between each of the above mentioned tests and the biological assays.

In the case of concentrates of poorer quality, or margarine, nonbiological assays introduce certain complications that effect their accuracies. For example, the colorimetric procedure, when used to test margarine, tends to overestimate the vitamin A potency by about 600 USP units per pound. This is believed due to some conversion of vitamin A to the biologically-inactive anhydro vitamin A. The method is useful, however, as a screening test on open market samples.

Digest from "Estimation of Vitamin A in Margarine. I. Collaborative Study of Assay Methods for Estimating the Potency of the Vitamin Concentrates," and "II. Laboratory Control Procedures in Assaying Uncolored Margarine," by D. Melnick, F. H. Luckmann and H. W. Valteich, *Journal of the American Oil Chemists' Society*, 104-8, 121-26, March and April, 1952.

"Stretches cloth life with just a handful of CELITE"

From a Celite Field Engineer's report on apple pressing

"THE FOREMAN of this apple pressing plant in my territory is well satisfied with the benefits obtained since they began to sprinkle a handful of a Celite* Pressing Aid on the cloths before pressing.

"Now when the cloths are opened up, the cake snaps out cleanly—they no longer have to beat them with sticks to remove the pomace. Washing is required less frequently, with the net result that cloth life has been greatly increased."

• • •

Longer cloth life is one of several money-saving reasons why more and more fruit processors are using Celite Pressing Aids. Faster production, clearer juice and higher yields are other important benefits that are obtained when these diatomite powders are added in small amounts to the pulp before pressing.

HOW CELITE PRESSING AIDS WORK

The tiny Celite particles, open and porous in structure, interpose themselves between the particles of solid pulp matter. This opens up countless minute channels through which the juice can escape, freely and at lower pressure. More juice is thus extracted in less time. The drier cake is more easily removed and the cloths can often be re-used without washing.

Celite Pressing Aids are used with practically all types of fruit products. No special equipment is needed and the benefits they assure will usually more than pay for the small amounts of powder required.

IF YOU FILTER

Celite Filter Aids can bring you corresponding benefits in faster production, sparklingly clear juices, longer filtration cycles. They are available in 9 grades of particle fineness, each designed for a special filtering requirement. A Celite Engineer will be glad to give you all the facts.

*Reg. U. S. Pat. Off.

For further information, write Johns-Manville, Box 60, New York 16, N. Y.

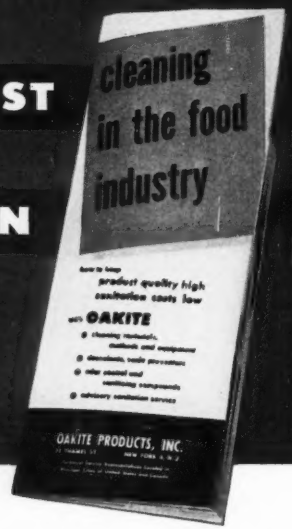
JOHNS-MANVILLE JM PRODUCTS

Johns-Manville CELITE

PRESSING AIDS

Free Guide

TO LOW-COST SANITATION



How to

- Clean kettles, cookers, fillers, smokehouses, refrigerated trucks, etc.
- Control bacteria, mold, slime, algae, odors.
- Lubricate conveyor chains.
- Remove rust and scale from equipment and water-circulating systems.

32 pages of job-proved cleaning procedures—yours free in this illustrated booklet.

Shows how you get *better, faster* cleaning—with complete safety to equipment—with Oakite materials and methods.

Just clip the coupon and mail it. Do it now!

SPECIALIZED INDUSTRIAL CLEANING
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MATERIALS • METHODS • SERVICE

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Send me, without obligation, a copy of "Cleaning in the Food Industry."

NAME _____

ADDRESS _____

_____

COMPANY _____

Rabbits Processed

—*Continued from page 57*

cutup frozen animals per 8 hr. day. Also this firm is the only rabbit packer to have initiated continuous in-plant USDA inspection.

The operation starts each morning when the inspector first examines all rabbits in the live-storage room. Then in lots of 120 they are transferred in mobile pens to the killing room.

While held by the hind feet, each rabbit is rendered unconscious by a sharp blow to the head from the butt of the operator's knife. Then it is killed. Decapitation and severing of three of the feet follow, whereupon each body is hung by its remaining foot to one of the poultry-type hooks moving on an overhead monorail. An average of 100 rabbits an hour can be handled in this way.

Hides are now removed and the rabbits move through a wall port to a separate room in which evisceration, inspection, and final dressing take place. The skins are stretched on wire frames and dried in an air-conditioned room (85 deg. F.) prior to being sold to furriers.

Killing and evisceration are in separate rooms so as to avoid chances of rabbit hair or other light material adhering to the skinned animals.

Panned Like Poultry

The evisceration table is the same type as is used in poultry plants. As the monorail moves the rabbits above the table, stainless steel pans are automatically positioned directly beneath each. The operator drops all viscera into the pan, then animal and pan arrive simultaneously for the inspector's scrutiny.

Since undesirable rabbits are rejected by the packer's buyers at the producing farms, it is rare that any of the dressed animals are condemned.

After inspection, they move through a spray washer and are removed from the hook. The remaining foot is now severed, then the body is dropped into a tank of cool water. The pans continue to move around the oval track to a point where the viscera is dumped from them. Then they are spray washed before starting another cycle.

Heretofore, the lungs and windpipe were left in the dressed whole rabbit. However, to provide a thorough inspection of the body cavity, the USDA now requires that these organs be removed. This causes a 2½-percent weight-loss in each animal but insures a high quality product, ready to cook.

After their temperature has been

lowered in the tanks, the rabbits are placed in wire baskets each holding lots of six. Fifteen baskets are stacked on a truck and wheeled into the 34 deg. F. pre-cooling room. Capacity of this room is 6,000 animals.

Removed from this cooling room the following day, whole rabbits are wrapped in locker paper. Those slated for sectionizing are routed to the cutting department for division into eight pieces, which are then packed into lithographed cartons with cellophane innerseals. The cartons are stacked on racks, moved into the quick-freezing room, and frozen with air at −25 deg. F. The freezer and subsequent cold storage room can also hold 6,000 rabbits per day. Temperature in the storage room is 0 to −5 deg. F.

Two 7½ hp. compressors provide refrigeration for the freezer, while two 5 hp. units serve the precooler and storage rooms. When running at capacity, the plant employs 30 people.

End (Resume reading on page 58)

Voltage Removes Filth

—Continued from page 54

30,000v. As product continues through this electrostatic field, corn and impurities are separated—their differing electrical charges deflecting them into bins.

Physically, the complete electrostatic process is housed in a single unit structure 9 ft. high and 4 ft. wide, with the roll length varying to suit capacity. This we call a "Coronatron" separator. An iron and aluminum frame houses eight smooth, highly polished brass conveying and grounding rolls which are all rotated from a single 5 hp. motor. Adjacent to the roll and electrode housing is a compact cabinet-enclosed station which includes a generator, transformer, and control. This is set up for 440v. a.c. input.

Due to the high resistance of the electrical circuit involved there is no explosion hazard from sparking with this machine, which has been fully approved by our insurance underwriters for mill installations. Its total power requirements are about 6 hp.

Flow of product through the unit has been set to balance maximum cleaning action with full capacity. First, the corn passes over two so-called "roughing" rolls, which remove the greater proportion of foreign matter. Then the partially cleaned corn (approximately 85 percent) passes over four finishing rolls that complete the operations.

if your problem is to

GRANULATE
CRACK
PULVERIZE
SHRED
FLAKE

consider the SPROUT-WALDRON

ROLLER MILL

Here is a Roller Mill that has many size reduction uses in the processing industries.

Equipped with rolls of correct corrugations and run at proper differentials, it will granulate your product, crack it, pulverize it, shred it or flake it. For many products it is the most economical grinder.

For full details about the Sprout-Waldron Roller Mill write to Sprout-Waldron & Co., Inc., 35 Logan Street, Muncy, Pa.

When you have a size reduction problem it will pay you extra dividends to consult with Sprout-Waldron. Nowhere else will your problem receive as impartial an analysis—nowhere else will you find as wide a range of types of machines, nor as wide a range of sizes and styles of each type.

SW
MUNCY, PA.

SPROUT-WALDRON

The Best in **PROCESSING EQUIPMENT** *Since 1866*

246

NEW! fulltred®

Floor Wax with Ludox*

Slipping Retarded with Ludox* Colloidal Silica in FULLER'S New Industrial Floor Wax

Above:—Wax film of approx. .0001" thickness, magnified 200,000 times to show how your feet press "Ludox" spheres into the larger wax particles.

For Factories, Institutions and Buildings

Now Fuller's water-base wax has been fortified with "Ludox" for added slip-resistance. "Ludox" particles are minute spheres *harder than wax* which are imbedded in the wax film. When the wax is stepped on, the hard "Ludox" spheres are pressed into the larger, softer wax particles. This creates a snubbing action which keeps the foot from slipping.

Fulltred needs no buffing . . . dries with high gloss. Water-resistant . . . freeze-resistant . . . spreads smoothly and easily. Safe for all types of floors. Available in 1 and 5 gallon cans and 30 and 55 gallon drums. For further information write today.

* *Registered trade mark of the duPont Co.*

At home...in business, too

INDUSTRIAL Fuller BRUSH CO DIV.

3640 MAIN STREET HARTFORD 2, CONN.

Fullergript, Wet and Dry Mops, Brooms, Floor and Special Brushes.

Reject from the roughing rolls—amounting to about 15 percent of the head feed—is run through a short mechanical cleaning system (aspirator, shaker, gravity-separator) and then again over two recleaning rolls. The final rejects at this point should amount to approximately 3 percent of the head feed. These are discarded. The semi-clean fraction is then recirculated and goes to the four above-mentioned finishing rolls.

In addition to the above recirculating system, all reject from the finishing rolls—amounting to about 25 percent—is also recirculated and joins the head feed.

Installations of the process were completed last fall in our Akron, Chattanooga, Sherman (Tex.), Cedar Rapids, and St. Joseph (Mo.) mills. The Akron installation—which was the first on-stream—employs two units that clean 2,500 bu. of corn per hour.

Plans for Commercialization

In view of the great interest already displayed by other millers, as well as by the Food & Drug Administration, we are making the new process available to the industry on the basis of an installation fee plus a royalty figured on volume of corn milled.

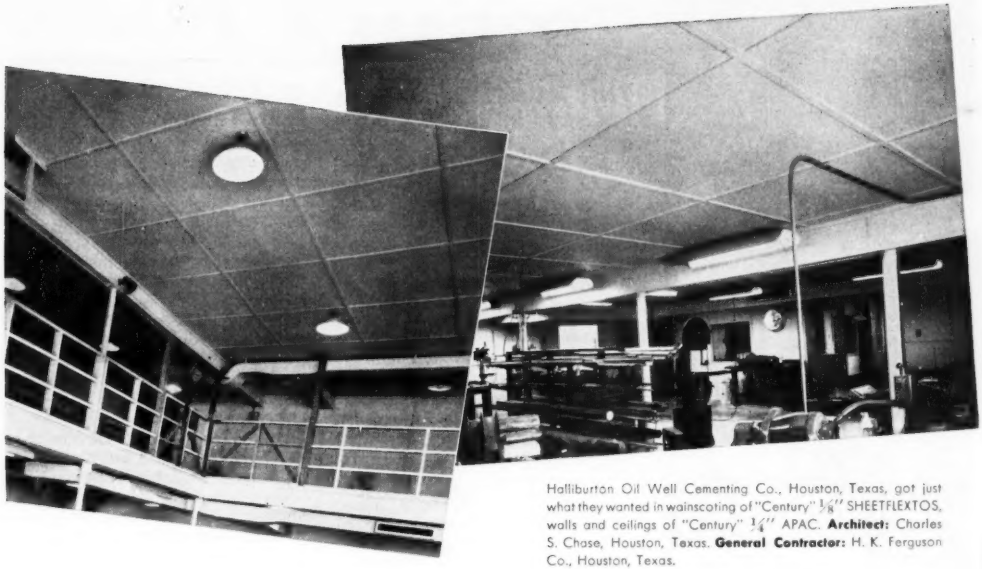
To expedite the above service, we are set up to fabricate the whole roll structure and its accessories, using company shop facilities. And we are prepared to send trained engineers into the field to supervise installation and start-up.

Since we are also aware of interest in the use of this equipment on products other than corn, we are now experimenting with other grains and already see signs of wide applicability. In fact, it might be said that the process may be a factor wherever you have a separation in milling. And it is believed that other fields, including brewing and pharmaceutical manufacture, may benefit from this corn-cleaning development.

At present we have set up an installation advance fee of approximately $20,000 for a unit to serve a 500 bu./hr. mill, with a correspondingly smaller or larger fee as the size of the equipment involved varies to match a needed capacity. Subsequent royalty payments will depend on the manufacturer's throughput.

Since the electrostatic cleaning process is such a departure from conventional mill cleaning practices, we are suggesting that those interested arrange to inspect our installation at Akron. At such time we would discuss specific problems in more detail and suggest arrangements for handling them.

End (Resume reading on page 55)



Halliburton Oil Well Cementing Co., Houston, Texas, got just what they wanted in wainscoting of "Century" 1/8" SHEETFLEXTOS, walls and ceilings of "Century" 1/4" APAC. **Architect:** Charles S. Chase, Houston, Texas. **General Contractor:** H. K. Ferguson Co., Houston, Texas.

Walls without worries

. . . ceiling without overhead

with **"CENTURY"**

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Halliburton Oil Well Cementing Co. wanted strong, good-looking walls and ceilings that would be *fire-resistant* and *easy to clean*. That's why they chose "Century" SHEETFLEXTOS for wainscoting applied over solid sheathing and "Century" APAC secured right to studs and joists for upper walls and ceilings.

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But look at the *extra* features that go with "Century" APAC and SHEETFLEXTOS. Both Sheets are also resistant to rodents, immune to termites. They go on fast, in big sheets (standard 4′ x 8′) that can be cut or drilled on the job, and fastened easily with screws or ring-fettered nails. They obviate the need for laths and plaster, and, while they require no painting at all, they take decorative colors well. SHEETFLEXTOS, as its name implies, has the added advantage of flexibility, to make curves and domes where indicated.

Both "Century" APAC and "Century" SHEETFLEXTOS make good surroundings for successful work and enjoyable living. Figure on one or both for your attractive, fire-resistant interiors. Write us for further details about these economical products . . . and name of your nearest distributor.

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• **BULLETIN ON REQUEST.** Bulletin No. 100 shows how food packers are making profitable use of this machine and how you, too, can use it for closing small paper bags.

Union Special
MACHINE COMPANY
450 N. Franklin St., Chicago 10, Ill.

Questions & Answers

THIS MONTH'S PROBLEM

Question—*We are confronted with the problem of increasing evaporator output in our plant, where we have several small multiple-effect units. Would you kindly tell us how we may augment the capacity of this present equipment?*

Answer to May Problem

The Question Was—As a small manufacturer of frozen citrus concentrate, we have been encountering some of the typical problems. Primary among them is product stability—preventing the concentrate from gelling in the can or separating into watery and thick juice layers. Can you advise us?

Answer—Product stability hinges greatly upon the various pectic enzymes present in the citrus juices. Inactivation of such enzymes should insure a stable product.

Since the pulp suspended in the juice contains a high percentage of these enzymes, gentle screening should be the removal procedure rather than high-pressure finishing (which may force enzymes into the juice).

Inactivation of the enzymes may be accomplished at an intermediate concentration, say at 20 deg. F. Brix. It may be achieved by flash heating and cooling this type of concentrated juice. And it has been found that a more complete inactivation, with the least effect upon the fresh fruit flavor, can be expected in the intermediate concentrating range.

Cereals That Stay Crisp

Question—I have developed a method of honey-processing cereals. In general, the process involves puffing wheat, rice, or corn; coating with 50-60 percent, by weight, of honey; crisping the mixture; and then forming it into a compact, 1-oz. block (3¼x3x1¼ in.). Four-month old samples have retained their crispness and flavor, and a few 4-yr.-old samples are surprisingly good despite lack of crispness. Samples that are expensively wrapped and well sealed remain crisp after 4 mo. However, unwrapped or wax-paper wrapped blocks of the product lose crispness within a few hours under very humid conditions.

Can you suggest how I can package this product to protect it from moisture penetration and subsequent loss of crispness? And can something be added to the honey during processing that would prolong the crispness of the cereal without changing its flavor?

Answer—We suggest packaging your extremely hygroscopic honey-coated cereal in a triple-seal fiberboard carton (with or without impregnated wax), having a laminated waxed overwrap and an inner wax-impregnated or thin-gage aluminum foil liner.

To enchance the crispness of your cereal, try adding a small amount of corn syrup—in the ratio of 1 part syrup to 5 parts of your honey. This simple treatment should materially extend the shelf-life of your packaged cereal-confection product.

There will be little or no effect in the use of corn syrup on the flavor of your product. And it should eliminate most of the stickiness encountered when the cereal is under adverse warehousing and marketing conditions. It's quite possible that a slight change in the honey-corn syrup ratio may correct the stickiness problem entirely.

To Make Hot Fudge Topping

Question—We would like to manufacture a commercial type hot fudge topping—one that is creamy, non-gummy, and which cannot be poured. Would you kindly furnish a formula?

Answer—The following formula is suggested: Melt slowly and then heat to 150 deg. F. 90 lb. of bitter chocolate, 15 lb. of cocoa powder, 75 lb. of coconut shortening, and 3 lb. of glycerin. Now add slowly 75 lb. of corn syrup and 2 lb. of vanillin. A very smooth, creamy product can then be obtained by running the mixture through a colloid mill or any similar unit.

How Would *You* Do It?

Readers are invited to submit to FOOD ENGINEERING answers to questions in this department, especially to "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise). We pay space rates.

What Is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

Ice Coating of Pipes

Question—We have had considerable trouble with heavy coatings of ice on our refrigeration pipes and coils. This condition makes frequent defrosting necessary in order to prevent too great a load on our refrigerating unit. Are there any organic or inorganic materials that, when sprayed on these pipes and coils, will prevent the formation of ice?

Answer—Many unit-type coolers defrost continuously by spraying coils with a low-freezing-point liquid, such as calcium chloride. Due to constant pickup of moisture, this liquid becomes diluted and it must therefore be evaporated to restore its original concentration.

Though satisfactory for the operation of unit coolers, in which a pan below the coils collects the liquid, this method obviously cannot be employed for wall or overhead coils. To our knowledge, there is no low-freezing-point liquid which, when applied to the latter, prevents formation of frost.

Temperature vs. Produce

Question—We seek information concerning the effect of temperature on the rate of deterioration of fresh produce—fruits and vegetables.

Answer—Work has recently been conducted by the USDA and the California Agricultural Experiment Station on the storage life of fresh spinach, held at various temperatures. With certain limitations, the findings apply to other fruits and vegetables. They are as follows:

Temperature (Deg. F.)	Storage Life (Days)
32	66
41	42
50	13
59	7
68	4
77	3
86	2

High temperatures not only accelerate deterioration, ripening, and respiration, but they also favor decay. And the activity of decay-producing microorganisms is accelerated by temperature in the same manner as respiration of the produce.

As a result of respiration of produce in cargo shipments, heat is liberated. If not dissipated, this heat speeds respiration and, consequently, deterioration.

Certain vegetables—spinach, peas, broccoli, lettuce, sweet corn, and snap beans—have high respiration. Fruits, in general, have lower respiration rates. However, berries will liberate large amounts of heat.

Wanta pump something at lower cost?

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Air
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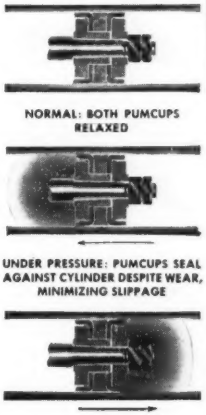
Ammonia
Beer
Benzol
Boiler Feed Water
Brewer's Mash
Butter
Butane
Cane Syrup
Calcium Carbonate Slurry
Calcium Sulfate Slurry
Casein Solutions
Cement Slurry
Chocolate
CO_2 Gas
Crude Oil
Dairy Products
Dye Solutions
Edible Oils
Ethane
Fish Oils
Formaldehyde
Fresh Water
Gas, Manufactured
Gas, Natural
Gasoline
Glucose
Glue
Glycerine
Glycols
Hydrochloric Acid
Hydrofluoric Acid
Ink
Jam
Jelly
Ketchup
Lacquer
Latex
Mash
Methane
Milk
Molasses
Naptha
Nitric Acid
Nitrogen
Oil, Crude
Oil, Refined
Oxygen
Paint
Potassium Hydroxide
Propane
Raw Boiler Feed Water
River Water—Dredging Operations
Rosin
Salt Water
Shortening
Sludge
Soap
Sodium Chloride Solution
Sodium Silicate
Sodium Sulfate Solution
Starch
Sulphuric Acid
Sump Water
Sweet Water
Tomato Juice
Varnish
Vinegar
Viscose
Water (various)
Wax
Whey

THIS list of fluids will give you a rough idea of the diversity of pumping jobs in which Darcova Pumcups are responsible for really *big* savings.

It boils down to the fact that Pumcups all but eliminate fluid slippage *throughout* their life span . . . and they *last many times as long as other packings.* Think of the down-time avoided, the production gains due to prolonged high efficiency, and the time-and-money-saving reduction in maintenance!

Years of application research have gone into the development of Pumcups. Made today in standard as well as many special compositions and textures for a wide range of temperature and pressure conditions, they offer you superior cost-cutting service in virtually *any* pumping job, simple or tough! And they're available in diameters from 1 to 20 inches.

DIAGRAM OF DARCOVA PUMCUP ACTION (greatly exaggerated)



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Why not weigh *all* the facts? Bulletin 4401 covers Darcova Pumcups for reciprocating pumps; Bulletin 4502 on Pumcups for air or hydraulic mechanisms. Write for yours today.

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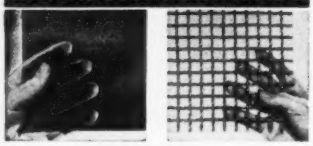

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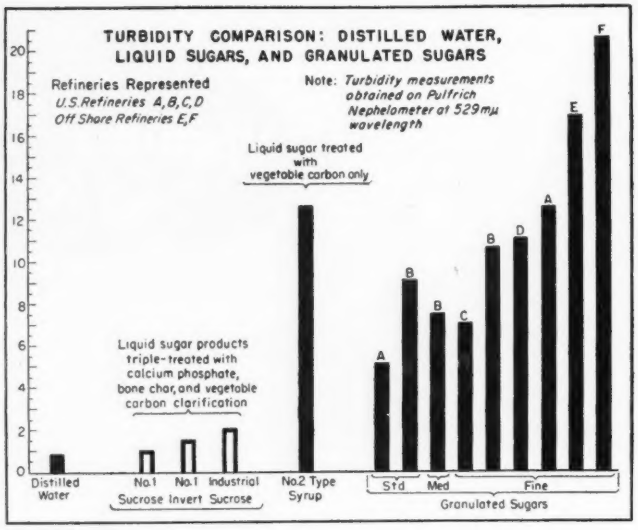


Testing Beverage Quality

Question—*We are finding difficulty in controlling the quality of our soft drinks. Shortly after bottling, there is a noticeable loss in the true aroma and flavor characteristics of our beverages. We have contacted our flavor supplier, and he has assured us that there are no variations in the strength of his materials. He suggested that impurities in certain sugars might be to blame. What do you figure is the reason for this flavor loss, and how can we control it?*

Answer (by P. X. Hoynak, General Sales Manager, Refined Syrups & Sugars, Inc.)—Changes in the flavor of carbonated beverages may be attributed to water, residual chlorine, acids, alkalies, metals, and oxidation.

Some years ago, we learned that traces of colloidal material in sugar adversely affect flavor and aroma of beverages. Flavor changes caused by the presence of colloidal matter in sugars are not always apparent immediately after the beverages are made up. However, on standing there are pronounced flavor losses.

There are three methods now being used in our refinery, and by several bottlers, for testing sugars to determine if they ultimately will adversely affect true aroma and flavor:

1. Test for odor-producing substances in sugar products. Measure 25 fl. oz. of 67 deg. Brix liquid sugar or dissolved granulated sugar in a wide-mouth quart jar. Add ¼ oz. of 85 percent phosphoric acid, and bring up to 32 fl. oz. with cold water. Allow to stand at 86 deg. F. for at least ½ hr. and note the odor from time to time. To avoid odors from cap liners, coat cap with aluminum foil.

When testing 77 deg. Brix liquid invert sugar, measure 20 fl. oz. and proceed as above.

2. Floc test at the density of the bottled beverage. Measure 4 fl. oz. of 67 deg. Brix liquid sugar or dissolved granulated sugar in a wide-mouth quart jar. Add 5½ fl. oz. of 10 percent citric acid and bring the volume up to 32 oz. with cold water. Let stand under refrigeration six to ten days.

For 77 deg. Brix liquid invert sugars, use 3½ instead of 4 fl. oz.

3. Floc test at beverage-syrup density (33.5 deg. Be.). Measure 30 fl. oz. of 67 deg. Brix liquid sugar or dissolved granulated sugar in a wide-mouth quart jar. Add 1¼ fl. oz. of 10 percent citric acid and bring volume up to 32 fl. oz. with cold water. Allow to stand six to ten days. (Refrigeration hastens floc formation.)

For 77 deg. deg. Brix liquid invert sugars, use 25 fl. oz. instead of 30.

Liquid sugars that are refined with bone and vegetable carbon show less turbidity and colloidal matter than those made by a straight carbon process. This also holds true for granulated sugars.

The accompanying chart shows differences in the turbidity of liquid and granulated sugars of different types.

Trouble With Vacuum System

Question—*We are concentrating fruit juices at low temperatures and running into difficulty in maintaining a steady vacuum in our processing system. Cause of our trouble, we believe, is skipping, or "motor-boating,"*

in the steam booster attached to the vacuum system. Can you suggest what can be done to eliminate skipping?

Answer—If you are certain that all air leaks have been sealed and that they are not the cause of your problem, then, in all probability, skipping is due to the presence of wet steam (slight condensation). This condition can be readily eliminated by installing wet-steam separators. However, a more positive method is to superheat the steam in the boiler by 10-15 degrees.

Skipping not only causes an unsteady vacuum in your juice-concentrating system, but it also makes it difficult to control adequately your processing operations. Uncontrolled changes in the vacuum adversely affect the efficiency of the process—temperatures go up and off-flavors are imparted to the juice being concentrated.

The efficiency of the concentrator is reduced because the boosters cannot handle the water vapor being evaporated from the juice, thus capacity of the unit is cut down. What's more, corrosion takes place at the steam nozzles in the booster.

Ripe Olive Problem

Question—We are packing ripe olives successfully in glass containers. Recently we have been investigating the possibility of also canning them, but we have been informed that such a pack is liable to spoilage and that there is the possibility of botulism. Please advise.

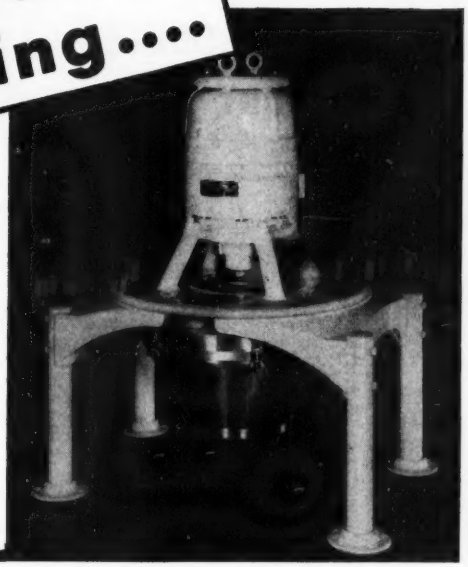
Answer—For some time, the canning of ripe olives of the Mission and Manzanillo varieties was considered dangerous from a standpoint of the occurrence of spoilage and botulism. Consequently, most packers went to glass—containers that employed solid-rubber gasket caps.

The hazard encountered in canning ripe olives centers on the fact that alkali in the olives attacks the tinplate, thus making it porous. As a result, there is loss of vacuum and subsequent development of spoilage.

This condition has now been corrected, however, by development of a suitable lacquer coating that protects the tinplate from the corrosive action. Furthermore, sealing compounds have been improved so that a double-seamed can will hold its vacuum.

Here's a satisfactory method of processing ripe olives for packing in enameled cans: Olives are picked when they are cherry-red. After grading, the ripe olives are placed in rectangular vats, and then covered with

Improved Mixing....



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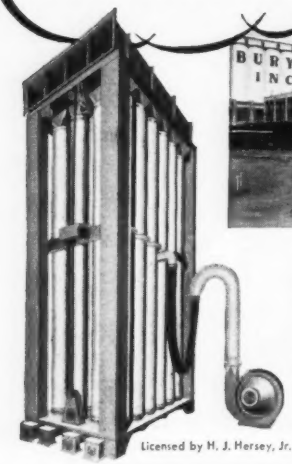

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In the immaculate Pillsbury Bakery Mix plant at Springfield, Illinois, ingredients for the family of Pillsbury Prepared Mixes are blended with slide-rule precision. This giant "mixing bowl" which serves the bakeries of America is a model of its kind—every operating unit has been selected for its functional advantages.

Here DAY-engineered, Day-fabricated and DAY-installed equipment contributes to over-all efficiency and economy. Materials are stored in DAY bulk storage bins, 41 in all, constructed from galvanized or stainless steel as the use dictates. As part of the DAY dust control systems, DAY "AC" Dust Filters control dust and capture valuable ingredients. As elsewhere in the food processing industry, these DAY installations are providing dependable, high efficiency service for Pillsbury Mills, Inc.

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CONTINUOUS-AUTOMATIC OPERATION . . . use of slow-traveling, reverse jet air cleaning rings eliminates cleaning shutdowns.

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DAY black iron, galvanized or stainless steel bins provide bulk storage at low cost. Materials cannot stick to the smooth inside surfaces or bridge in DAY's scientifically designed hoppers. Heat-conducting steel walls give better control of temperatures and eliminate "sweating" or inside condensation. Capacity may be increased by adding sections.

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a 1-2 percent solution of sodium hydroxide (lye). Olives are kept in this solution 2–3 days. Next, the olives are washed several times with fresh water, until testing shows there is no alkali in the wash water.

This treatment intensifies the color of the olives and removes the bitterness. The unpalatable bitterness is attributed to the presence of oleuropein.

Now the olives are cured in brine of gradually increasing strength until a 3-4 percent concentration is reached in about 2 days. A final concentration of 5 percent brine is employed in the last stage of this treatment. Ripe olives are then held in this brine for a week. It is necessary to make sure that the olives are completely covered with brine.

During this treatment, fermentation occurs, with the result that lactic acid is formed. Sufficient acid is produced to retard the development of putrefactive microorganisms.

Treated ripe olives are then packed in enameled cans and covered with 2½–3 percent hot brine. Cans are vacuum-sealed.

Finally, the cans are loaded into retorts and processed at 240 deg. F. for 60 min., or 250 deg. F. for 50 min. This treatment will destroy spore-forming bacteria such as Clostridium botulism.

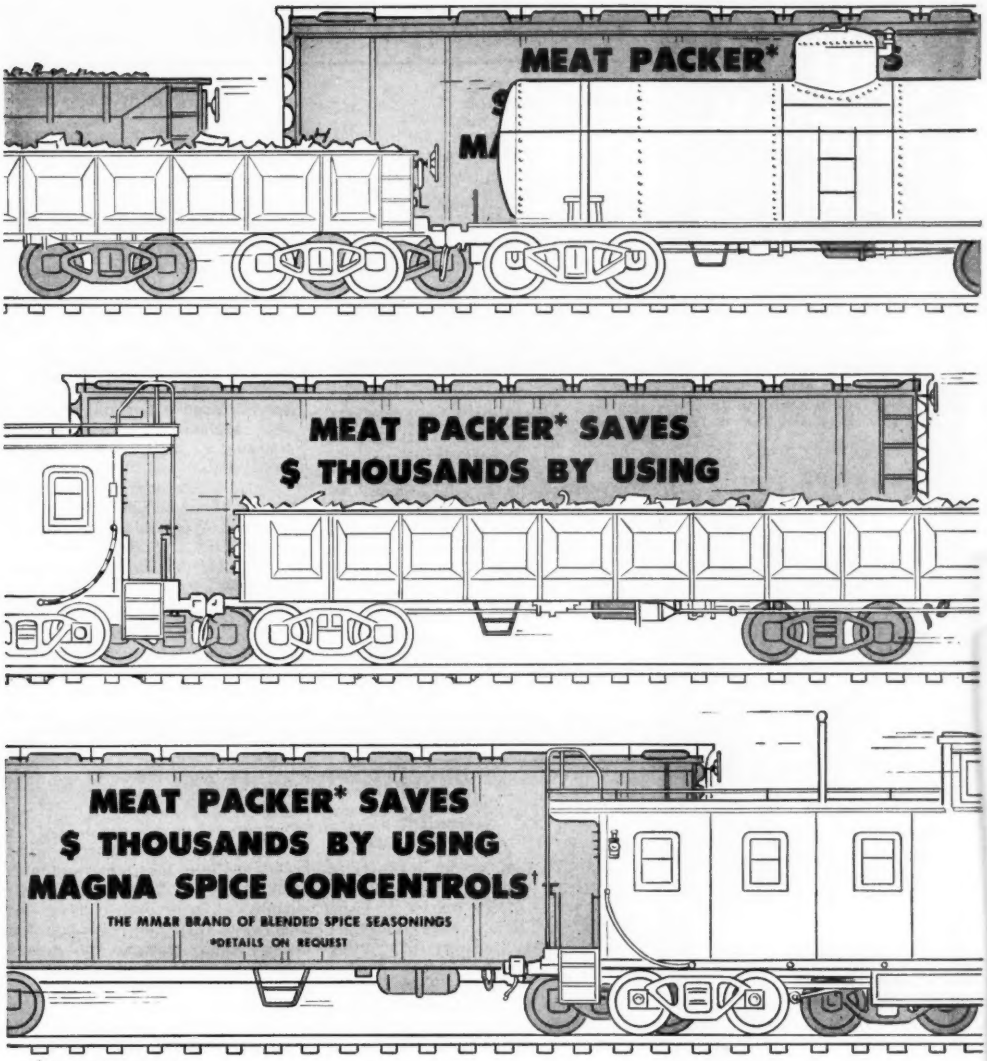
Peanut Brittle Formula

Question—We are interested in manufacturing a good peanut brittle, hence would like you to give us a formula and processing details.

Answer—Here's a simple formula: Granulated sugar, 20 lb.; corn syrup, 5 lb.; shelled peanuts, 5 lb.; molasses, 2 lb.; butter, 12 oz.; cream of tartar, 3 oz.; baking soda, 5 oz.; and water, 2 lb.

Now to making the peanut brittle: Add all ingredients except the butter, peanuts, and baking soda into a steam-jacketed kettle. Thoroughly mix and boil moderately to 250-260 deg. F. Now add the butter and roasted peanuts. If the shelled peanuts are not roasted, introduce them into the kettle when the temperature of the syrup is 240-250 deg. F. Continue boiling slowly with constant agitation to 292-296 deg. F. Scrap down all sugar crystals adhering to the side of the kettle as the steam is turned off. Sift baking soda into the mixture, and mix quickly with as little stirring as possible. Finally, pour on a cooling slab (slightly greased) to form a thin sheet.

Amounts of ingredients may be varied to get the product desired.



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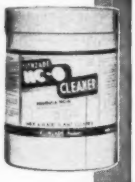

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Useful New Books & Government Publications

Milk Handbook

DAIRY BACTERIOLOGY AND PUBLIC HEALTH. *By C. S. Bryan. Published by Burgess Publishing Co., Minneapolis 15, Minn. 33 pages; 8½x11 in.; paper. Price $1.25.*

Primarily a handbook for milk sanitarians, this brochure lists the more common factors affecting the bacterial condition of milk, from cow to table.

There are many tables covering surveys, also information on analytical results, with non-technical language stressed to better acquaint dairy workers with health aspects.

Checking Plant Methods

INDUSTRIAL PROCESS CONTROL BY STATISTICAL METHODS. *By John D. Heide. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., N. Y., 1952. 297 pages; 6¼ x 9¼ in., cloth. Price $6.*

Here, the author presents a practical guide to the present day methods and applications of industrial quality control. Actual factory problems are analyzed and solved to demonstrate the principles involved, and any math presented is on as nontechnical a level as possible.

Essentially, the volume describes the procedure of installing a program of statistical control in the plant, and how to operate and administer such a program. To this end, the reader is shown the most recent methods of graphical, process-data presentation, how to construct frequency histograms, how to design and construct control charts, and ways of spotting reliable test results.

A complete appendix is included. In it may be found definitions of all terms and symbols used in the text, standard charts and tables helpful in statistical work, and an outline for setting up an operating procedure manual for establishing and maintaining measurement control.

Latest in Oil Series

THE ESSENTIAL OILS, VI. *By Ernest Guenther. Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York City 3, 1952. 481 pages; 6¼x9¼ in.; cloth. Price $9.75.*

This volume completes Author Guenther's six-part series. Like the third, fourth, and fifth volumes, it is composed of monographs describing the individual oils. Many of these will be of interest to those in the flavor fields.

The descriptions of each oil include historic summaries; material on the botany, producing regions, and world production statistics; data on extraction methods; physical and chemical characteristics; and many literature references.

An end table lists the taxonomic classification of all oils mentioned throughout the six volumes.

Newest Packaging Works

HOW INDUSTRY IS SOLVING ITS PACKAGING PROBLEMS. *Also* MILITARY PACKAGING REQUIREMENTS, OUTLOOK FOR MATERIALS AND EQUIPMENT. *No. 36 and 37, respectively in Packaging Series of the American Management Assn., 330 W. 42nd St., New York City 36, 1951. No. 36, 39 pages; No. 37, 60 pages; 6x9 in., paper. Price $1.25 each.*

Composing the packaging problem volume (No. 36) are seven papers by different industry men. Among topics considered are: Increasing Packaging Efficiency Through Coordinate Action, Designing the Package as Part of the Product, Shock Protection and Cushioning, and Significant Advances in Packaging Printing.

The publication on military packaging (No. 37) covers two panel sessions and five papers presented at the 1951 Packaging Conference. The panels go into the military requirements and the materials availability picture, while the papers cover the training of packaging personnel, flexible packaging materials, and organization pertinent to handling packaging material and equipment.

Stream-Pollution Laws

INDUSTRIAL WATER POLLUTION: A SURVEY OF LEGISLATION & REGULATIONS. *By Marvin D. Weiss. Published by Chemonomics, Inc., 400 Madison Ave., New York City 17. 1951. 142 pages; 6x9 in.; paper. Price $5.*

The author has compiled this work to bring industry up to date on the latest federal and state legislative activity dealing with pollution of the country's waterways.

Notably, the voluminous and repetitive approach has been avoided here in order to accent the essential aspects of the laws, especially with respect to their effect upon industrial establishments within any state in question.

Where standards of water quality have been adopted, they are given in their entirety.

The book, after discussing federal aspects, takes up the various states in turn. Each state's responsible control agencies are listed in the appendix.

Government Publications

TESTING OF MEASURING EQUIPMENT. *By Ralph W. Smith. Department of Commerce, National Bureau of Standards Handbook No. 45. 205 pages; 6¼x9¼ in.; cloth. Price $1.25.* This is a manual for state and local weights-and-measures officials. Described are the various types of commercial measuring equipment, the principles of their operation, and methods for their inspection and testing.

AGRICULTURAL STATISTICS, 1951. *Prepared under direction of Yearbook Statistical Committee, Department of Agriculture. Price $1.75.* Brought together here are the more important statistics concerning agriculture. Tables selected present a wide variety of facts in forms suited to most common uses.

These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered directly from the Bureau responsible for its issue.

SELECTED METHODS FOR DETERMINING REDUCING SUGARS. *Compiled by J. E. Hodge and Howard A. Davis, Northern Regional Research Laboratory, Peoria, Ill. Document AIC-333 of Bureau of Agricultural & Industrial Chemistry.* This manual brings together detailed procedures for methods selected by the Starch & Dextrose Division. Sufficient detail is included so that analyses can be made without recourse to other texts.

FOLIC ACID CONTENT OF FOODS. *By E. W. Toepfer, E. G. Zook, M. L. Orr, and L. R. Richardson. Bureau of Human Nutrition & Home Economics, Agricultural Handbook No. 29. Price 45c.* This is a resume of special laboratory work and pertinent literature concerning determination of folic acid content of foods. Included are detailed descriptions of the analytical methods used with handy listings of all reagents.

BECAUSE a baked food product can be no better than the finishing touches given it by the baking process—Num Num Foods, Inc., of Cleveland, Ohio has wisely entrusted this responsibility to an Advance installation. Crisp, crunchy, golden-brown Num Num Pretzels now roll off the Advance-built conveyor system at the rate of about 300 pounds per hour. Custom-designed with three wire mesh belts—one for baking and two for dry kiln with a catch and return system for excess salt, it is another successful example of more than 20 years devoted exclusively to the problems of oven design and construction.

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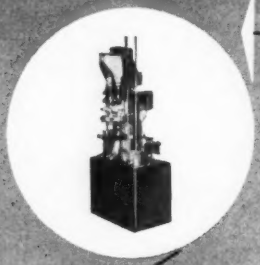

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MATERIALS:	Cellophane, Polyethylene, Glassine, Coated Kraft, Pliofilm and others.
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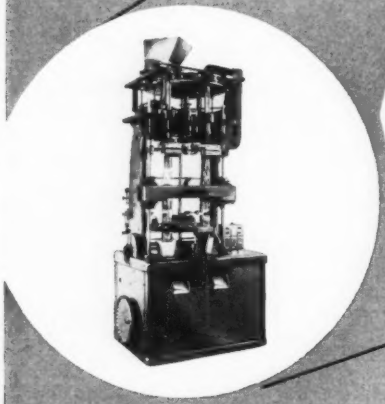

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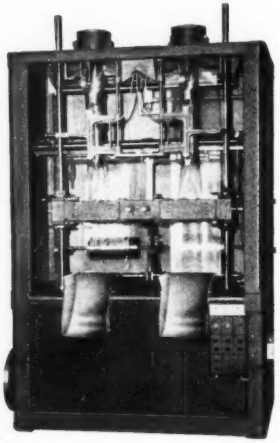
Work horse of Flexible Packaging — for most jobs.

PRODUCTS:	Candies, nuts, syrups, sugar, rice, pills, crackers, tidbits, marbles and like products.
FEEDS:	Volumetric, Auger, Liquid, Net Weight.
MATERIALS:	Foil, Cellophane, Polyethylene, Pliofilm, Vinyl, Saran, Laminations, Kraft and others.
SIZES:	2½" square to 5" x 6".
STYLE PKG:	Fin Seal or Pillow.
PRODUCTION:	Average — to 100/min. Double — to 240/min.
EXTRAS:	Gas fill, counter, photo-registry, Strip Seal for pillow with laminations, printing attachment.



MODEL "C"

Hydraulically operated — for larger size packages.

PRODUCTS:	Dried fruits, nuts, candies, chips, crackers, minced products, powders and many others.
FEEDS:	Volumetric, Auger, Liquid, Net Weight.
MATERIALS:	Foil, Cellophane, Polyethylene, Pliofilm, Saran, Kraft and other heat-sealers.
SIZES:	Up to 9½" x 13½".
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Latest Technical Developments Spotlighted at IFT Convention

More than 1,100 food technologists, engineers, and industry guests were briefed on recent outstanding technical developments at the 12th annual gathering of The Institute of Food Technologists, held last month at Grand Rapids, Mich. Here are the highlights:

▶ **Solids Classification** – Application and modification of the slurry-cyclone to low-cost, high-capacity classification of solids in foods has been a prime project at Northwestern U. Originally used in the mining industry to recover ore fines, the unit can separate particles as fine as 0.004 in. and varying by as little as 1 percent in weight from other solid material.

Materials to be separated–from cereal grains for example–are fed into the cyclone in a liquid suspension by means of conventional pumps. No moving parts are used in the compact but efficient separator, and the system is continuous.

▶ **"On Flavor" Egg Whites**–General Foods' scientists have successfully removed sugars from commercial batches of egg white before drying with the enzyme glucose oxidase. Heretofore, the conventional way of taking out these sugars (bacterial or yeast fermentation) considerably reduced the products' shelf life and made for development of off flavors and odors.

This system can probably be applied to the processing of natural fruit juices, where small amounts of oxygen have been reported to be responsible for the development of off flavors during pasteurization and storage, according to the GF people. And it has already been adopted to the commercial stabilization of beer by one large brewer.

▶ **Antibiotics as Preservatives** – Research over two years by the Fisheries Research Board of Canada has concerned 15 different antibiotics and has uncovered several promising leads. Tested as anti-deterioration agents in meats and fish, aureomycin and terramycin were found to be the most impressive of the group. Rimocidin also looked good in checking the growth of yeasts and molds in flesh foods.

Use of antibiotics in foods is still open to question. But the fact that less than 1/15 oz. is needed to inhibit spoilage of a ton of flesh food has brought technologists to look over the possibilities very carefully–especially since the antibiotic would probably by destroyed during cooking.

▶ **Cherry-Red Cherries**–Experimenters at the John C. Morgan Co. of Traverse City, Mich., have hit upon a scheme for retaining the natural color in the canned, water-packed, red tart cherries. They found that phytic acid, when introduced into the cans, would hold the cherry color to a degree proportional to the amount of the additive. A decided taste improvement was also indicated.

▶ **Latest Irradiation Techniques**–Unwanted side reactions when sterilizing foods with X-rays and cathode rays may be greatly minimized by incorporating "acceptor" compounds into the foods to be treated. These agents protect the flavor molecules or nutrients by accepting the free-radicals produced by the ionizing radiations.

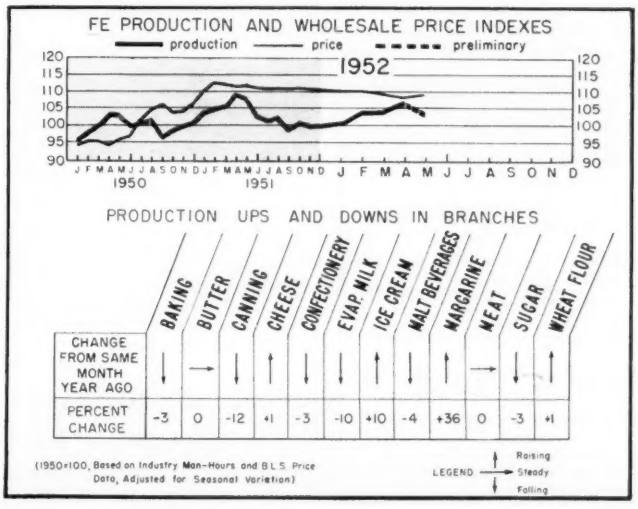
Advantages of this technique are: Elimination of expense of using inert atmospheres, freezing, or vacuum, and reduction of necessary radiation dosages. Work is being done on this project at the food technology labs of M.I.T.

▶ **New Vanilla Agent**–Propenyl guaethol, known commercially as Vanitrope, bids fair to produce better, less expensive vanilla flavors. Tested in the Foster D. Snell laboratories it was found to have 15 to 20 times the flavor strength of vanillin, a widely used synthetic. Vanitrope also has the pronounced winey-woody flavor predominant in pure vanilla extracts, but lacking in the other substitutes.

It appears that combinations of the new compound with vanillin give the best flavor results when used as a substitute for the pure agent. Vanitrope has been developed by the Organic Research Dept. of Shulton, Inc., of N. Y.

▶ **Soup Tester**–The Quartermaster Food & Container Institute has come up with a simple and quick test for measuring the consistency of cream-type soups, according to H. W. Fritzche. The new method uses a standard stirring procedure with a modified Stormer viscometer.

▶ **More on Food Irradiation**–Working independently of the M.I.T. group Dr. Wolfgang Huber of Electronized Chemicals Corp., Brooklyn, arrived at many of the same conclusions as to ways to prevent off flavors during



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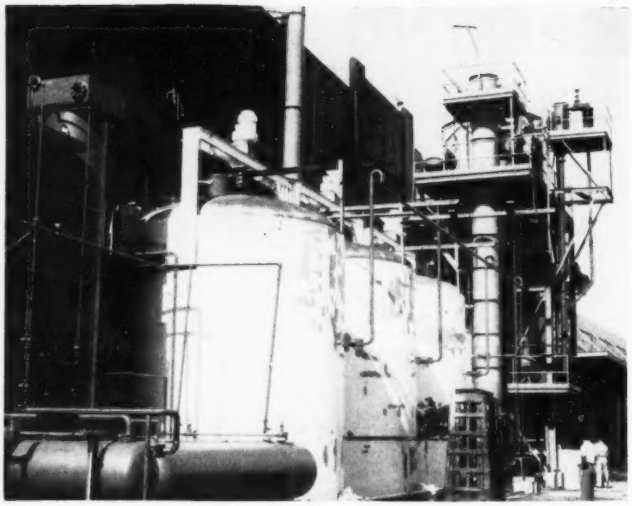

New Concentrator Readied

Camera catches Hawaiian Pineapple Co.'s unique new low-temperature juice concentrator as it gets its finishing touches. Built by the C. E. Howard Div. of the Carrier Corp., this advanced pineapple juice facility features a vacuum fractionating column to separate the volatile flavoring esters from the feed. The three cold-wall juice storage tanks (12,000 gal. each) are equipped with motor driven agitators. Production was slated to be underway as we went to press.

sterilization by irradiation. Application of foods to freezing, oxygen removal, synergistic effects (use of mild heating with radiation), and addition of chemical protectors derived from food origins all appear to improve shelf life and flavor in irradiated foods.

On the last point, certain spices, herbs, or roots, when incorporated in small amounts into foodstuffs prior to irradiation, exhibited marked protective qualities.

Also, pre-storage of foods at subfreezing temperatures (—30 deg. F.) for periods of up to 96 hr. appears promising. During this time the available oxygen in the stored substances is consumed by metabolizing cells.

▶ **Confirm Officers**—The following IFT slate of nominees for '52-'53 was elected during the meetings: President, B. E. Proctor, M.I.T.; President-elect, B. S. Clark, American Can Co.; Executive Secretary, C. S. Lawrence, Food Research (reappointed); Treasurer, P. K. Bates, Riker Laboratories, Inc. (reappointed); Assistant Treasurer, A. N. Prater, Gentry, Inc.

Radical Juice Extractor

A revolutionary type citrus-juice extractor will soon be operating on a pilot scale, according to the Air Line Engineering Corp. of Altadera, Calif., fabricators of the unusual prototype.

Expressing juice entirely under vacuum, the machine is designed to offer advantages in terms of yield, flavor, sanitation, and peel byproducts.

The makers state that in its cycle of operation it halves fruit, vacuum dejuices it, deragg the peel, separates flavedo from albedo, and steam cleans the vacuum cups returning to pick up more fruit. The juice does not come in contact with air.

Byproduct recovery may possibly be greatly simplified with this new unit—any one or all of the operations on the peel being omitted as desired. H. T. Lannen and E. R. Odom have been issued Patent No. 2,598,418 covering the extractor.

AIB's "Chemical" Stand

The American Institute of Baking has taken a formal position on the hot question of "chemicals in foods"—the first organized food group to do so. In its six-statement creed, the AIB declared that "We believe—

I. It is the responsibility of the food industry to exert every effort toward the production and distribution of foods that are wholesome and nutritious, assuring safeguards against contamination and adulteration.

II. Industry should continue to im-

prove the nutritive value, wholesomeness, palatability, and convenience of its products, but should continue to keep public health and welfare as the first consideration.

III. Every substance not represented by long usage in human diet should be subject to question as a food ingredient, and that this question should be resolved by adequate animal experimentation.

IV. Every new substance proposed for use in foods should be adequately pre-tested by either the manufacturer or user—this to be required by law.

V. Government should control those factors which may adversely affect public health. Therefore, all test and experiments should be reviewed by the F&DA before the substance is allowed to be sold.

VI. The amended Food, Drug & Cosmetic Act of 1938 does not provide adequate authority for the F&DA to control chemicals in foods on which Standards & Definitions have not yet been promulgated, and the law should be modified in this respect."

To Make "Green Gold"

Archer-Daniels-Midland Co., one of the Midwest's largest crop processors, has invaded the chlorophyll and xanthophyll fields with its purchase of Keystone Chemurgic Corp., Bethlehem, Pa. Further, it plans to buy Chlorophyll, Inc., of Modesta, Kan.

At the same time, ADM announced formation of a new chlorophyll division to be headed by Donald G. Carpenter. Division headquarters will be in Minneapolis.

Test Wine Clarifier

The wine field's latest hope for producing a swift, simple clarification of its product is going into final test stages. Employed is the Fessler Compound, named after its inventor, Julius Fessler of the Berkeley Yeast Laboratory.

Minute traces of soluble metals are reported to be removed effectively by this agent.

The compound, which is a combination of salts having a prompt flocculating action, will be tried out by a number of California wineries for a period of one year. This use will be under strict supervision of the Bureau of Food & Drug Inspections, California Department of Public Health.

Preliminary tests at the U. of California and the California State Division of Laboratories have indicated

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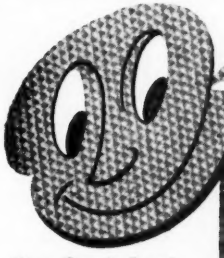

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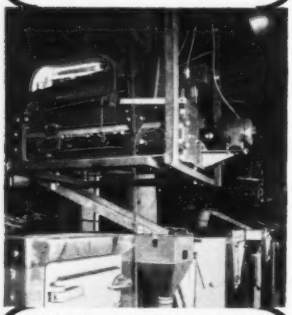

W&T Merchen Feeders feeding cocoa beans to roasters at Hershey Chocolate Corporation, Hershey, Pa.

The volumetric feeders supplying the Roasting & Separation Systems at Hershey Chocolate Corporation were not compensating for density changes in the beans.

A Merchen Scale Feeder was installed in each system giving precision feeding — by weight. The precision feed made separation more efficient, and production was increased by over 10%. Hershey had planned to add additional roasting and separation facilities but the Merchen Feeders increased the efficiency of the existing systems enough to easily carry the load.

Pleased with this performance of Merchen Scale Feeders, Hershey later installed eight more feeders on their main cocoa bean blending line.

Hundreds of food and industrial plants are enjoying similar benefits from W&T Merchen Scale Feeders. Write today for information on Merchen Feeders — and how they can benefit your plant.

M-20

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that the agent eliminates the principal cause of cloudiness in wines without affecting the final bouquet of the product.

In appearance, the agent has a creamy texture, is brownish in color, and disperses very easily when added to a wine. By varying the quantity, it is possible to extract either copper or both copper and iron completely, or to a reduced concentration.

Simple settling or filtration is all that is needed to remove the agent after its dispersal in the wine as a colloidal floc.

The Cuvinex Co. of San Francisco will manufacture this item on a commercial scale.

Vitamin A In Oleo Order

New margarine standards of identity, recently released by the Federal Security Agency, now call for use of vitamin A. It may or may not be accompanied with vitamin D concentrate.

Finished product should contain not less than 15,000 U.S.P. units. Vitamin A potency may be furnished by fish liver oil, by concentrates from animal sources, or from synthetic sources.

Court Stays Bread Law

Following appeal by Atlas Powder Co., a stay in the effective date of the recent bread standards, as it applies to the polyoxyethylene monostearates and other related emulsifiers, was granted by the Third Circuit U. S. Court of Appeals on June 10 (June FE p. 191).

Atlas pressed the original case in the Philadelphia court for its "MYRJ 45". Then after the decision was reached, the Federal Security Administrator on June 13, exempted Glyco Products Co.'s "Sta-Soft" emulsifier as well as other comparable polys —until the Court renders its final say on the Atlas petition.

Under the terms of the Court's ruling, the week of Oct. 6 has been set for a review of the original order as it affects the chemical bread softeners in question.

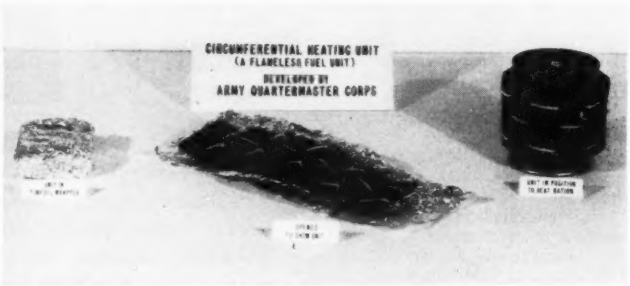
Advancing Lard Quality

Low temperature of fat rendering shows promise of producing a better grade lard—with no loss in yields. Facts presented by C. E. Swift, of the USDA's Agricultural Research Center, Beltsville, Md., indicate favorable progress toward this end through development of advanced processing technics.

Essentially, the general process used at the Center in its research work consisted of mechanical disintegration of skin-free cutting fats while in the 0-37 deg. F. range, followed by relatively low-temperature rendering with mechanical agitation in an open steam kettle, and then lard-solids filtration.

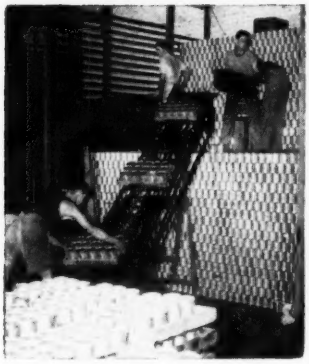
Grinding conditions were found to be critical in getting the highest yields —both temperature of the cuttings and screen size affecting the final fat recoveries.

Screen openings of from 1 in. down to ¼ in. were tried, with the latter proving best. A disintegration temperature of 0 deg. F. yielded more lard than either 26 or 37 deg. F. On the other hand, the rate of heating in the kettle and the temperature of rendering had little affect on the percentage of lard recovered from the cuttings.



QM's Handy Field Heat

Here is the new circumferential unit designed for heating of army ration cans in the field. Still in the experimental stage, the device operates on a principle similar to that of the hot-patch in tire vulcanizing. It is ignited with a match after being wrapped around the can and will bring the contents to the proper temperature in a few minutes. No protection from the wind is required. Burning is accompanied by very little smoke and odor, and there is no visible flame (U. S. Army photo).



Biggest Down-Under Cannery

Workers are shown stacking products prior to labeling and shipping at the largest fruit and vegetable cannery in the southern hemisphere, located at Leeton, Australia. Although only established in 1935, Leeton Cooperative Cannery Ltd., now employs more than 1,300 plant personnel. Canned products are turned out at the rate of 450,000 per day. The group uses 20,000 tons of fresh raw material yearly for processing. (Eastern Publishers Service)

Vigorous agitation was also found to be a necessity in achieving maximum yields—with stirring required to break apart all the tissue aggregates. Low product moistures were obtained by allowing the cooked mixture to stand and cool for 15 min. before filtering—the proteinaceous residue picking up the water.

Comparisons of the low temperature lard with commercial shortenings (vegetable, animal, and mixed) as to odor, flavor, and color are reported by the Research Center as being favorable to the former.

Offers Scholarship Aid

Ohio State U. announces a new scholarship fund, in the amount of $200 annually, to be granted to high school graduates who have superior records and who want to study the horticultural processing industry.

This stipend is furnished by the J. Weller Co. Applications should be filed on or before September 1 on a special form provided by the Dean's office, College of Agriculture, Townsend Hall.

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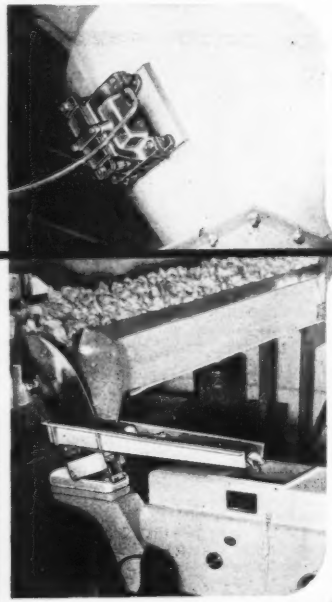
FOOD FACTS



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PROVIDE efficient handling with variable control of power and rate of flow, of most all types of dry or damp bulk foods.

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SYNTRON CO.

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urement of the soluble whey protein content has been developed by Harold Salwin of the Quartermaster Food & Container Institute, Chicago.

Beverage quality is normally a function of the heat to which the dried milk was subjected. And the whey proteins are particularly susceptible to high temperatures—increasing in protein coagulation (and reducing its solubility) with a higher heat-time factor.

Actual measurement is accomplished by dissolving the dry skim-milk in a sodium hydroxide solution and adding copper sulfate. The resultant "biuret reaction"—a violet-blue color formation—is an indicator of the soluble whey proteins, and can be measured by the intensity of color.

Lactose will also react to give a blue color, but can be accounted for by adding a measured amount of this component. In this manner, the Institute researchers established a standard error calibration curve compensating for this milk sugar.

Beer Consumption Climbs

American brewers furnished Mr. and Mrs. John Q. Public with 1.1 percent more beer in '51 than in '50—or 16.6 gal. a year for every person in the country.

Output statistics: Over 80 million 31-gal. barrels were produced last year by the 290 brewing firms operating 325 U. S. plants. Packaged products, canned and bottled, accounted for 74 percent of all the beer sold (as against 50 percent in 1940). This has been a broad trend, with the food store becoming the prime sales outlet—superseding the tavern.

Well over 4 billion pounds of grains and other agricultural products went into making the nation's beer last year. The breweries also bought about 4½ million beer cans, 700 million returnable bottles and 1½ billion one-way bottles.

Wisconsin, with 46 breweries, produced the most—15 percent of the total—and also was notable as having the largest per capita consumption rate—26.5 gal. Following the Badger state in order of production were New York, Pennsylvania, and Missouri, and in order of consumption, Michigan, Maryland, Nevada, and Rhode Island.

Confectioners' Roundup

Members of the National Confectioners' Assn. recently traded news and views on key questions of the candy branch of the industry at their 69th annual convention in Chicago. High points are briefed below:

▶ **Candy Shelf-Life.** This is one major

RETARD RANCIDITY

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A few things RIEGEL can do for you . . .

- Keep products dry
- Keep products moist
- Retard rancidity
- Seal with heat or glue
- Provide wet strength
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- Retain aromas, flavors
- Resist extreme cold
- Reduce breakage
- Prevent sifting
- Protect from light
- Resist alkalis
- Resist corrosion
- Boost machine efficiency

RANCIDITY is a common problem for many products that contain natural oils or that are cooked in oil. It is a problem Riegel has solved for many different products such as potato chips, peanuts and prepared flours. A paper that is right for one product is not always right for another. In one case the answer may be a simple waxed paper . . . in another it may be a triple lamination of foil and special glassines. Whatever is needed, Riegel can usually tailor-make the right paper . . . quickly, efficiently, economically. Just tell us what you want paper to do for you. Write for more information to *Riegel Paper Corporation, P.O. Box 170, Grand Central Station, New York 17, N. Y.*

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LaPorte's Open Mesh Construction Feature enables you to keep your conveyor system hygienically clean at all times. Easily sterilized with steam or scalding water *without* removing belt from friction drum . . . free drainage prevents accumulation of waste . . . facilitates necessary circulation of heat, cold, moisture or air around products in process.

And whatever your process, you'll profit from extra years of dependable service with rugged LaPorte Belting. Built to last . . . to withstand extreme loading impacts. *Flexibility* assures tighter grip of belt on friction drum—can't creep, weave, or jump. Carries your product safely, quickly and economically through every operation . . . from bin to shipper!

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VERTICAL, TRANSFER TYPE

for GRANULES • BEADS • POWDERS
CRYSTALS • PASTES • SLUDGES • SLURRIES

DRYING
COOLING
TOASTING
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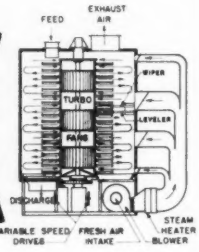

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gentle handling
uniform drying
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high efficiency

with
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Available in packaged unit for pilot plant and small production. Field erected units up to 25,000 lb. evaporation per hour.

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problem where research may be directly applied. Candy that has been returned (due to poor storage quality) represents 6 percent of the total volume sold or about $6,000,000 per year.

Use of antioxidants can help cut deterioriation of butter and animal fats, but high-grade vegetable oils often will not require a stabilizer—if the candy is stored under 100 deg. F. In an effort to have confections withstand high temperatures, the Pennsylvania Mfg. Confectioners Assn., with the aid of Lehigh U. researchers, has developed emulsifiers to be used in improved candy coatings. And sorbitol has proved effective in preventing the drying of many types of candies over long periods when ideal humidity conditions can't be maintained.

► **Confectionery Logistics.** The QM Food & Container Institute is involved in a number of projects aimed toward getting good candy to our armed forces whatever the environ-

(*Turn page*)

Hors d'Oeuvres

• *When live fish are shipped by water, they're not fed for about 24 hours before starting. Reason:* They get seasick.

• A synthetic tobacco has now been developed from sugar-cane bagasse, which is beaten, cut, abrased, screened, then chemically treated. But how do you sound off synthetically?

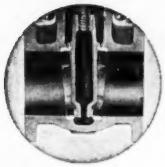
• *Spuds and sparklers provide the window dressing in a downtown New York jewelry store to emphasize the recent potato shortage. The store surrounded a lonely potato with gold and diamonds. Also, maybe the jeweler wanted a few extra eyes to watch his stock.*

• Biologists have discovered a powerful appetite stimulant in red wine, and as a result this tasty beverage is now being used to fight malnutrition. ". . . But, honey, I haven't felt like eating much in weeks."

• *Rival farmers are giving the weather man a fit out in Washington—what with wheat-growing "wets" firing iodide into the clouds to make it rain, and cherry-raising "drys" sending up cloud dispersing chemicals to prevent rain. Forecast: Variable and uncertain.*

• Pearls made from herring scales are now on the market in Norway. And they're said to develop an alluring scent upon aging. Better hold the phone until we check our translators again.

• *Congressman James Delaney, Chairman of the House committee on chemicals in foods, has submitted his first report on the group's findings—titled "Fertilizers". Glad to see the congressman is getting a down-to-earth approach to the subject.*



Straight-Flow Port Design reduces fluid turbulence to a practical minimum.

Seat Rings of end-seated type are screwed into the body.

Sure-Grip Malleable Handwheel for non-skid gripping even with heavy gloves.

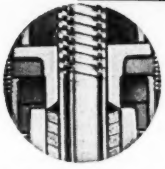
WALWORTH

iron body gate valves

with screwed or flanged ends

... 8 Outstanding Features

For complete information on these new Walworth Iron Body Valves, see your local Walworth distributor, or write for bulletin 106.



Brass Liner on Glands assures greater resistance to corrosion and scoring.

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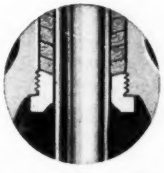
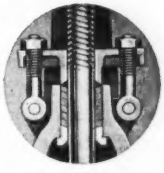
T-head Disc-to-Stem connection on OS&Y types provides stronger connection, prevents loosening of disc by corrosion.



Bronze Back-Seat Bushings in bonnets of OS&Y valves.

Solid Web Type Disc in OS&Y valves for greater strength and longer service.



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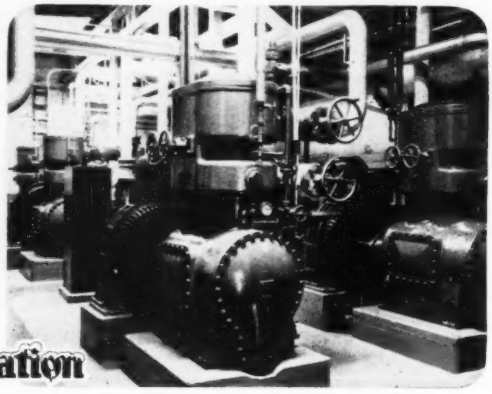
Four of Seven Frick Ammonia Booster Compressors in Service at the Fairmont Canning Plant, Fairmont, Minn.



FRICK Refrigeration

Serves Fairmont Canning Company

This famous Minnesota producer of frozen food uses eleven large Frick booster compressors, and six Frick second-stage machines, in its various plants, for maintaining low temperatures with economy and dependability.

The really important jobs – whether air conditioning, ice making, food freezing or other cooling work – call for Frick Refrigeration.

DEPENDABLE REFRIGERATION SINCE 1882
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WAYNESBORO, PENNA. U.S.A.

mental conditions or length of storage. One problem has been quick deterioration of certain coconut-type bars. Here, an unproven theory has it that the dessicated coconut may have been high in free fatty acid content at the time of use, due to age or improper storage conditions.

Peanut type bars, though in demand, have not been recommended for ration procurement due to uncertain stability. Coating of the peanuts with a combination of zein and antioxidants may be a solution. Surprisingly, spun candy bars containing peanut butter have proved very stable, even after ten months at 100 deg. F. The low moisture content of the candy center has apparently eliminated staling.

Coated chocolate fudge bars and disks with the addition of antioxidants and humectants have so far been the best, as far as stability goes. One problem with these bars, though, is that those now supplied crack too easily at normal temperatures due to the higher-melting fats present.

▶ **Corn Products Supply.** The possibility that confectioners will again face a corn sweetener shortage as serious as the one during the last war has been eliminated for all practical purposes by postwar plant expansions in the corn refining field. And there is some reason to believe that the trend of corn prices may be slightly downward. These views were presented by President A. E. Staley, Jr., of A. E. Staley Mfg. Co.

▶ **European Angles.** Hans F. Dresel, just returned from a trip through Free Europe, reported that the Dutch Candy Assn. is sponsoring investigations of the effect of glycerrhicinic acid found in licorice. It seems to have hormone-like quality and might be used favorably to combat certain diseases.

An item of interest in Germany is a process using after-fermentation of cocoa beans to produce a better chocolate color and improved crystallization factor in cocoa butter.

USDA Grade Standards

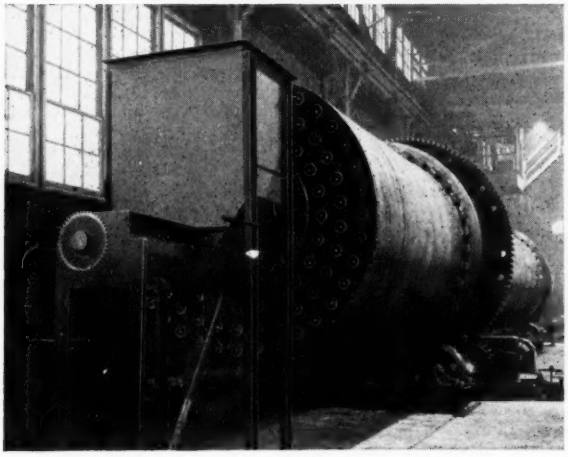
Recent actions by Production & Marketing Administration of U.S. Department of Agriculture on U.S. Grade Standards and related activities include the following:

Canned sweet cherries, third revision, proposed, page 3796, Apr. 29 *Federal Register*, written comments received until May 29.

Canned plums, third revision, proposed, page 3799, Apr. 29 *Federal Register*, written comment received until May 29.

Frozen lima beans, fourth revision,

New Dryer Requires the ACCURACY & UNIFORMITY of *Carpenter* Stainless Tubing



Modern food process equipment like this rotary steam-tube dryer has to *stay on the job.* You can't afford to interrupt a process for hours or days to replace tubes.

That's why—after considering several sources — this manufacturer's orders call for Carpenter Stainless Tubing. He knows that the quality standards we set at the mill will safeguard the quality reputation of his equipment.

Wherever food products are processed, Carpenter Stainless Tubing is used to safeguard product purity and product quality.

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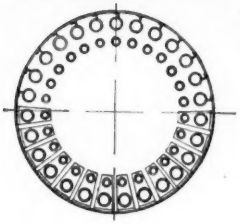


Section At "A-A"

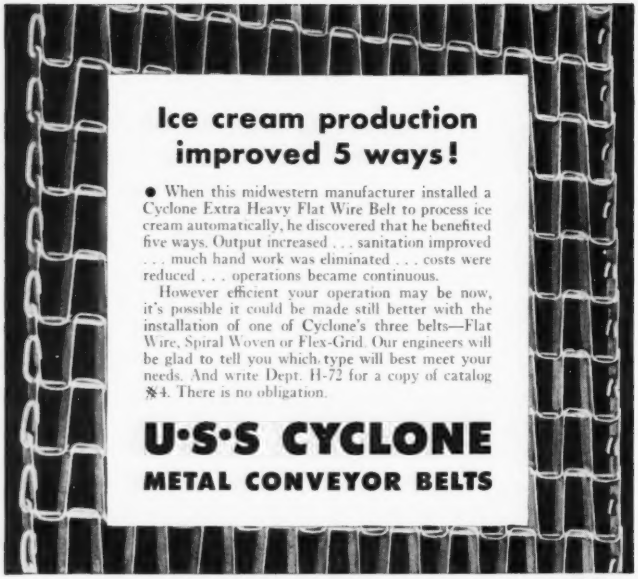
Cross-section view shows how Carpenter Stainless Tubing is arranged in concentric circles. Tubes in the inner circle are smaller diameter than outer tubes, to provide clearance and prevent lumps of material from wedging between tubes.

Carpenter

STAINLESS TUBING

—guaranteed on every shipment

THE U.S. NEEDS YOUR STEEL SCRAP NOW


Ice cream production improved 5 ways!
● When this midwestern manufacturer installed a Cyclone Extra Heavy Flat Wire Belt to process ice cream automatically, he discovered that he benefited five ways. Output increased . . . sanitation improved . . . much hand work was eliminated . . . costs were reduced . . . operations became continuous.
However efficient your operation may be now, it's possible it could be made still better with the installation of one of Cyclone's three belts—Flat Wire, Spiral Woven or Flex-Grid. Our engineers will be glad to tell you which type will best meet your needs. And write Dept. H-72 for a copy of catalog #4. There is no obligation.
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METAL CONVEYOR BELTS

CYCLONE FENCE DEPARTMENT
AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL COMPANY
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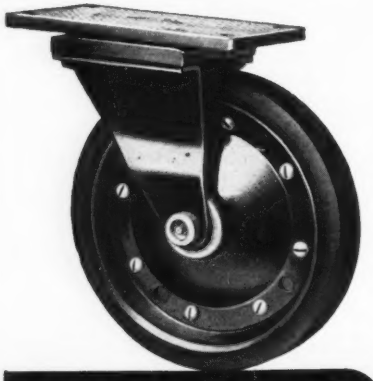
UNITED STATES STEEL

Efficient Materials-Handling at the "Grass Roots" Level

with Colson CASTERS



Model 4-807-65 Swivel fork caster — ideal for medium weight industrial equipment

● No matter how modern or streamlined your truck fleet, it's no better than the wheels and casters it rolls on. Surprising—how a few dollars spent for Colson casters can increase the efficiency of hundreds or thousands of dollars worth of rolling stock. There's a Colson for every need—from light casters for office furniture to heavy-duty jobs of 1500 pounds capacity.

Colson also manufactures a wide range of trucks—hand trucks, platform trucks, box trucks, drum and barrel trucks and Lift-Jack Systems. Write us or consult your phone book (under "Casters" or "Trucks—Industrial") for the Colson representative near you.

Write today for free 68 Page Caster Catalog

THE COLSON CORPORATION
ELYRIA, OHIO
CASTERS • • LIFT-JACK SYSTEMS • • INDUSTRIAL TRUCKS

page 3783, Apr. 29 *Federal Register*, effective May 29.

Frozen apples, revised, page 4106, May 3 *Federal Register*, effective June 2.

Frozen leafy greens (other than spinach), new, page 4315, May 13 *Federal Register*, effective June 12 of this year.

Table grapes, revised, proposed, deadline for written comments extended from May 3 to June 2, page 4352, May 13 *Federal Register* (Proposed revision appeared on page 2888, Apr. 3 *Federal Register*.)

F&DA Food Standards

Status of food standards of Food & Drug Administration in early June is reviewed below:

Future Hearings

1. *Salad dressing*, rehearing, standard of identity; "skim milk and milk products" proposed as optional ingredients. F&DA gathering data; no hearing date yet set.

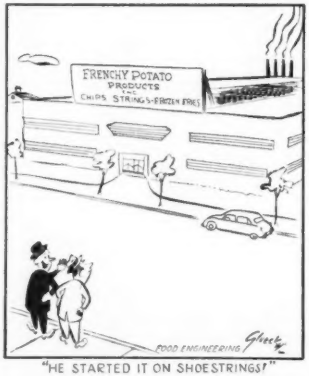
2. *Process cheese food*, amendment, standard of identity; skim milk cheese proposed as optional ingredient. Hearing expected soon, but date not yet set.

3. *Canned tuna*, hearing expected in 1952, but no date yet set; initiative of Administrator.

4. *Frozen vegetables*, hearing expected next year (1953); initiative of Administrator.

Hearings in Progress

Ice cream continues to make slow progress. Cross-examination of witnesses on the harmlessness of surface-active agents, scheduled into the latter part of June, will proceed again in September. July 16 has been set as the date for new evidence on



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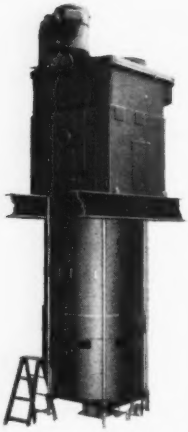
100% AUTOMATIC FROM SLURRY SUPPLY TO PRESSED CAKE



J-C's own development . . . the Floating Cone* . . . holds a constant, automatically controlled pressure against the pressed pulp as it is discharged.

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toxicity of these materials, to be presented by Swift and Co. Some of the expected testimony is that which was presented before the Delaney Committee in Nov. 1950 but which is not yet officially in the ice cream standard of identity record. Rebuttal testimony on other phases of the proposed ice cream standard may be scheduled during the forthcoming sessions of the hearing. Incidentally, the official transcript has passed the previous record number of pages (over 17,000) established in the bread hearing. Indications are that it may reach 20,000 pages by adjournment.

Tentative Orders Awaited

1. *Residue tolerances*, on fresh fruits and vegetables, new. Expected during summer of 1952; hearing adjourned Sept. 1950; briefs filed Dec. 1950.

2. *Canned pineapple and canned pineapple juice*, new, standards of identity, quality, and fill of container. Expected during latter part of 1952; hearing adjourned in April; hearing may be reopened on initiative of industry or Government if requested by July 15; if not reopened, briefs will be due shortly thereafter.

Final Orders Awaited

1. *Frozen fruits*, new, standards of identity and fill. Expected very soon; tentative order published in Oct. 1950; exceptions filed in Jan. 1951.

2. *Canned mushrooms*, amendment, standards of identity and fill. Not expected soon; tentative order published in Feb. 1951; exceptions filed in Apr. 1951.

Standard Completed

Margarine, amendments, standard of identity, page 4613, May 21 *Federal Register*, effective Aug. 19. Revised from tentative order to permit use of stearyl citrate as an optional ingredient and allow slight changes in permissible labeling of some of the ingredients.

Corrections

1. *Canned vegetables*, standard of identity, red sweet peppers and red-ripe pods of the sweet pepper plant, page 4482, May 16 *Federal Register*: On page 6377, Oct. 30, 1948 *Federal Register*, in the table under paragraph 52.990 (b), add in Column III the optional forms of vegetable ingredient "whole; halves or halved; pieces".

2. *Fruit preserves, jellies, and butters*, final order as reported in Food Engineering, May, page 222, included an erroneous statement. Cor-

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And all of these, the electric motors . . . the electric brakes . . . the gear reduction units . . . the variable speed drives . . . all are designed so they can be easily combined together to give you the RIGHT horsepower, the RIGHT shaft speed, the RIGHT mounting features in one compact power drive.

That's the horsesense way to use horsepower whether you want 1/8 horsepower or 200 horsepower.

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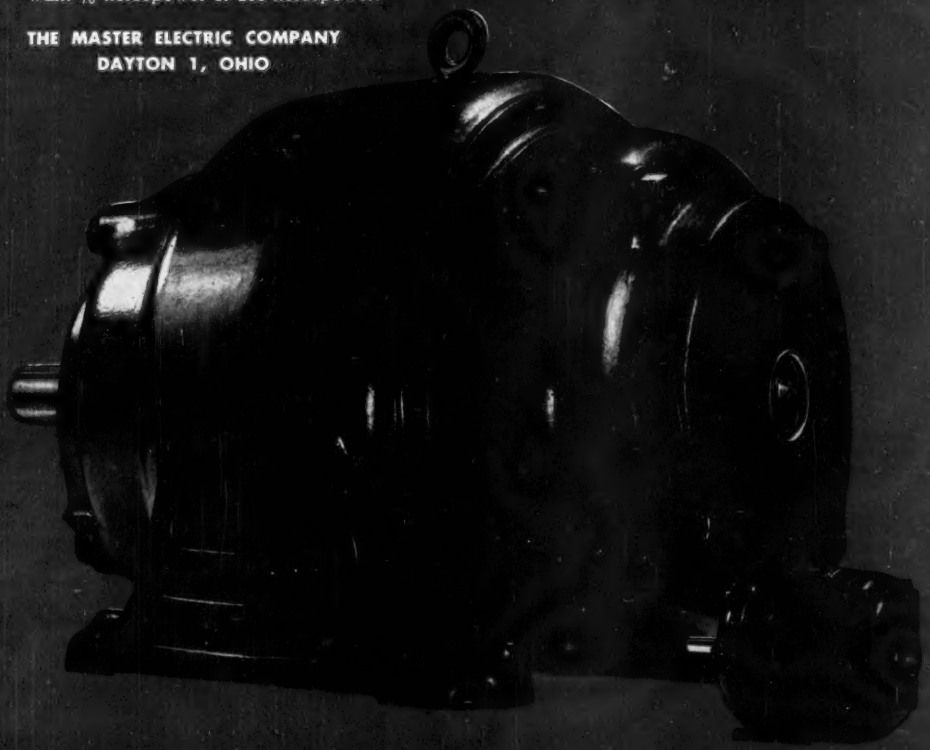
HORSEPOWER



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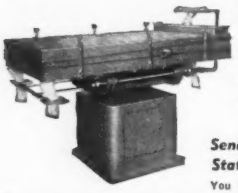

The Schutz-O'Neill Gyrator Sifter turns out a large volume of uniform, clean products. 1 to 3 sieve frames for single or multiple separation.

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For extremely fine grinding and uniformity of product, the principle of centrifugal impact with product carried by the air stream, has never been surpassed. Schutz-O'Neill Pulverizers utilize this principle to the fullest degree.

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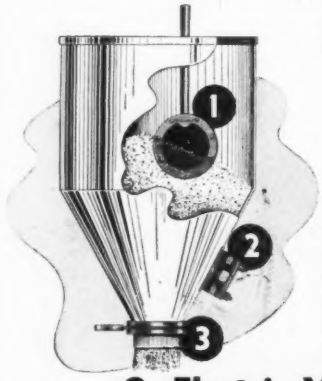
for Complete Hopper Efficiency—

SYNTRON



1. Hopper Level Switches

Eliminate spillage and shortage of materials. Automatically maintain desired levels of materials—from fine to coarse—in bins and hoppers. Control feeding.

2. Electric Vibrators

Assure free-flowing bins, hoppers and chutes. Eliminate arching and plugging of materials without hammering and rodding that damages equipment and wastes manpower.

3. Flow Control Valves

Control flow of bulk materials from bins, hoppers and chutes. Rotating control lever increases or decreases opening of flexible iris type diaphragm and flow of material without jamming or clogging.

Write For FREE Illustrated Folders

SYNTRON COMPANY

460 Lexington Avenue Homer City, Penna.

Schedule of Events

July

21–26—Industrial Microbiology Institute, fifth annual short course; Purdue U., Lafayette, Ind.

August

4– 6—International Apple Assn., 58th annual convention; Hotel Jefferson, St. Louis.

12–14—Western Packaging & Materials Handling Exposition; Shrine Convention Hall, Los Angeles.

September

4– 5—Dairy Industry Conference; Statler Hall, Cornell U., Ithaca, N. Y.

8–12—National Instrument Conference & Exhibit; Cleveland.

9–10—American Soybean Assn., 32nd annual convention; Purdue U., Lafayette, Ind.

9–13—National Chemical Exposition, 6th annual; Coliseum, Chicago.

---

rected, this report should have read: "Dextrose or glucose syrup solids were added to the list of optional sweetening ingredients without label declaration up to a maximum of 25 percent of total sweeteners."

—*End*—

Kraft's New Plant

—*Continued from page 74*

throughout manufacturing stages and storage.

In the central tower, cheddar cheese is elevated by stainless steel escalators to the top level, where it is ground up. It then moves by gravity through blenders and cookers on lower levels and finally to filling and packaging on the first floor. Salad ingredients, such as oil and vinegar, are pumped from bulk storage tanks to second floor holding and mixing vessels, then go by gravity to filling equipment on the main floor.

A comprehensive system of palletizing and tiered storage takes care of the movement of all commodities, with the exception of those liquids handled in bulk through pipe. Loaded pallets are placed on four-wheel trailers and moved by a single truck in train formation to storage, manufacturing, or shipping areas.

Extensive railroad and trucking docks (over 20,000 sq. ft.) have been provided for shipping and receiving. On these docks, strategically placed, pushbutton-controlled hydraulic ramps do much to expedite the turn-around of refrigerated cars and trucks.

To further speed product movement, there are 481 pushbutton control stations in the plant itself. Many of the robot operations (426 separate

why stick your neck out when buying folding cartons?

QUALITY-CONTROLLED EMPIRE CARTONS ALWAYS MEASURE UP TO YOUR REQUIREMENTS

There are good reasons why you never risk your neck when you buy Empire folding cartons. Empire Box controls carton quality throughout production — from paperboard . . . made in our own mill . . . to finished product.

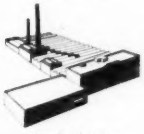
Empire Box keeps your costs under control, too, by utilizing up-to-date, more efficient production techniques. And Empire's multi-plant operation helps you save on shipping costs — an important money-saving factor.

Call or write Empire Box when next you buy folding cartons. You can always depend on Empire Box to deliver fine quality folding cartons at prices you can afford to pay.

EMPIRE BOX CORPORATION

GARFIELD, N. J. • CHICAGO, ILL.

3 GREAT PLANTS TO SERVE YOU



Garfield, N. J.

Stroudsburg, Pa.

South Bend, Ind.

This attractive package is representative of the fine folding cartons Empire Box is producing for leaders in industry.

quick! get

ANTIFOAM A

Foam wastes time; takes space; invites fire.

Kill foam with Dow Corning Antifoam A, the most efficient and versatile defoamer on the market. This silicone defoamer is also most economical to use because only trace quantities are required to quell many of even the most violent and persistent foamers.

Tar and asphalt, for example, are effectively defoamed during processing as well as during application by concentrations of Antifoam A as low as 4 parts in 10 million.

Ten ounces of Antifoam A added to a 40,000 gallon batch of crystallizing sodium bromide prevented foaming in that batch and in the next 21 batches as well. Here the effective concentration works out to about 1 part in 10 million.

If cost, contamination, or full use of process equipment are prime considerations in your operations, try Antifoam A. Practically odorless, tasteless and non-toxic, Antifoam A is safe, fast and by far the most economical and versatile defoaming agent on the market.

See for Yourself

Send for trial sample of Antifoam A

DOW CORNING SILICONES

Dow Corning Corporation
Dept. BF-19
Midland, Michigan

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Company_____

Street_____

City_____ Zone ___ State _____

DOW CORNING CORPORATION
Midland, Michigan

electrical motors do the work) take advantage of the very latest techniques in automatic food processing and do much to eliminate fatigue of production personnel.

Extensive Air Conditioning

The entire air-conditioning requirements of the building are handled by an absorption unit of 300-ton capacity.

Make-up air for processing areas is sensibly cooled before it is introduced into a section. After induction, the air is cooled through recirculating-type air-conditioning units to maintain desired room temperature and humidity.

All processing-area air is filtered through two different stages to keep dust, bacteria, and mold spores from the space and thus assure as complete sanitation as is possible. An impingement-type progressive filter comprises the first stage, and this is followed by an electrostatic separation treatment.

Cooling of dry storage areas is aided by the predominantly low night temperatures common to the locality. This cool outside air is automatically vented into the plant at night and exhausted at roof level.

Pushbutton control of the ventilating system is provided from a central panel in the plant engineer's office. The system can be operated either in combination or as individual units, depending on the air volume necessary and the area concerned. Sections of each unit are distributed through the areas and thus—through pushbutton operation and consultation of a multiple-indicator measuring inside and outside temperatures—the plant engineer can set up and equalize any desired set of conditions at any point in the plant.

Flexible Refrigeration

A standard ammonia system supplies refrigeration to all cold storage areas and to processing equipment. There are 9 compressors (totaling 400-ton capacity, 1 evaporating condenser, and 18 diffusers making up the system.

All diffusers have a flooded-ammonia system with solenoid liquid stop valves and thermostatically controlled back-pressure regulators. In addition to unit controls, a common instrument panel is located in the main compressor room, providing indication of both high and low pressures and temperatures throughout the system.

In processes requiring the service of more than one compressor, a single unit runs continuously and actually becomes the base load unit. Then the added refrigeration is cut in or out automatically as needed.

FOR THE FOOD INDUSTRY

BALDWIN SUPERTEX*

*Reg. U.S. Pat. Off.

WHITE NEOPRENE CONVEYOR BELT

WASHABLE
Easily cleaned.

WATERPROOF
Minimum shrinkage even when run under water.

TASTELESS
Food products can be carried directly on the belt.

NON-TOXIC, ODORLESS
Safe. Meets all sanitary and health requirements.

RESISTS HEAT
Used where heat is up to 250 degrees F.

STRETCHES LESS
Multiple plies of lightweight CLOSE WOVEN duck.

LEAVES NO IMPRESSION
Perfectly SMOOTH top cover.

HAS BONDED EDGES
Prevents fraying.

RUNS OVER SMALL PULLEYS
Full width fabric. No folds. No splices. Remarkable flexibility.

ENDLESS WITHOUT SEWING
Multiple step-lap outlasts belt itself.

ACID-ALKALI RESISTANT
Important in many industries besides food processing.

Send for CATALOG and get all facts, technical data and suggested uses.

Get the facts too on *TREAD-TOP* for conveying packages up inclines of 25-30 degrees. Write for technical data.

BALDWIN BELTING, INC.
76 MURRAY ST., NEW YORK 7, N. Y.

JENKINS PRACTICAL PIPING LAYOUTS 61

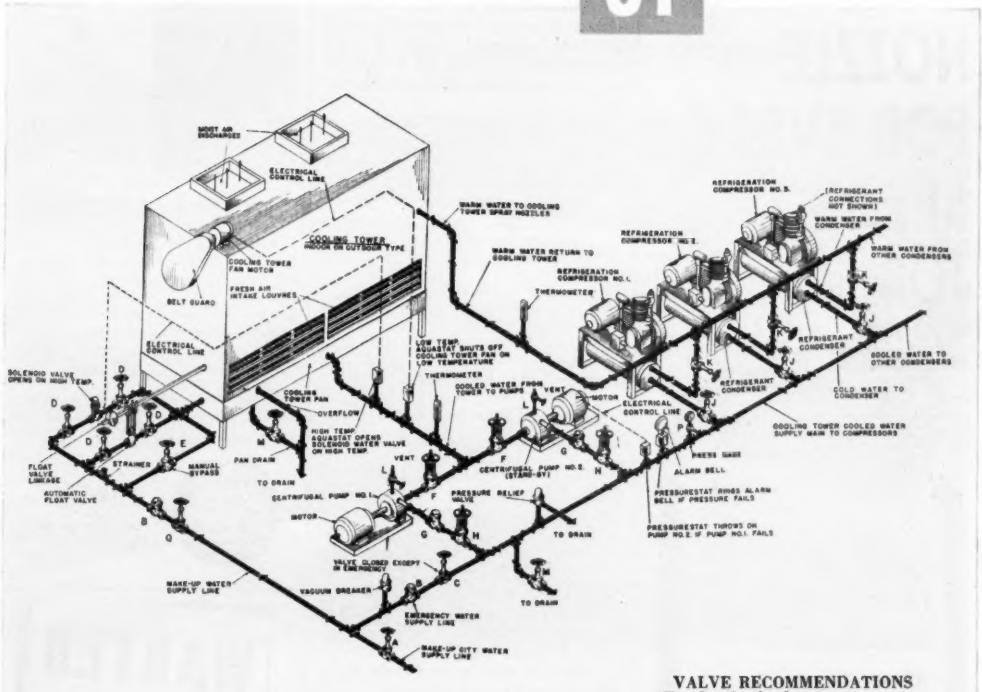


Diagram by Huxley Madeheim Consulting Engineer

COPYRIGHT, 1952 — JENKINS BROS.

How to plan a COOLING WATER SYSTEM FOR REFRIGERATION COMPRESSORS

Facilities for cold storage of frozen and perishable foods in super markets, hotels, restaurants and institutions are being expanded rapidly, creating a demand for small refrigeration compressors like the one illustrated.

In this cooling system provisions have been made to cope with all emergency conditions. These include piping for re-use and conservation of water. Moreover, should temperature of the water in the system rise above normal, fresh water is automatically introduced through a solenoid valve operated by a thermostat in the supply line.

Duplicate water circulating pumps insure continuous cool water supply to compressors since water-pressure failure in one automatically cuts in on the standby pump. To provide for the remote possibility of both pumps failing, an alarm system warns operator to turn on the emergency manually-controlled water supply.

Consultation with piping engineers is recommended when planning any major piping installations.

To save time, to simplify planning, to get all the advantages of Jenkins specialized valve engineering, select all the valves you need from Jenkins complete line. It's your best assurance of *lowest cost in the long run*. Jenkins Bros., 100 Park Ave., New York 17; Jenkins Bros., Ltd., Montreal.

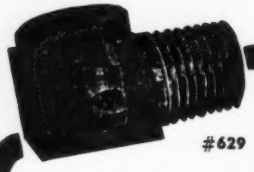
COMPLETE DESCRIPTION AND ENLARGED DIAGRAM OF THIS LAYOUT FREE ON REQUEST. Includes additional detailed information. Ask for Piping Layout No. 61.

VALVE RECOMMENDATIONS
For details of valves to suit varying conditions, see Jenkins Catalog.

Code	Quan.	Jenkins Valves	Services
A	1	Fig. 47 Bronze Gate	Main Water Supply Shutoff
B	2	Fig. 352 Swing Check	Prevent Backflow
C	1	Fig. 47 Bronze Gate	Emergency Water Supply Shutoff
D	4	Fig. 47 Bronze Gate	Automatic Valve Shutoff
E	1	Fig. 106-A Bronze Globe	Manual Bypass of Automatic Valves
F	2	Fig. 368 Bronze Gate	Pump Suction Shutoff
G	2	Fig. 352 Br. Swing Checks	Prevent Backflow to Pumps
H	2	Fig. 368 Bronze Gate	Pump Discharge Control
J	3	Fig. 106-A Bronze Globe	Control Water to Condensors
K	3	Fig. 370 Bronze Gate	Condensor Discharge Shutoff
L	2	Fig. 743-G Bronze Needle	Pump Vent Control
M	2	Fig. 106-A Bronze Globe	Drain Valves
P	1	Fig. 743-G Bronze Needle	Pressure Gage Control
Q	1	Fig. 47 Bronze Gate	Make up Supply Line

JENKINS VALVES

THERE'S A MONARCH NOZZLE FOR EVERY SPRAY JOB



#629

In many Food Processing plants Monarch Spray Nozzles are used to . . . .

Wax Fruits
Rinse Vegetables
Powder Milk
Dry Eggs
Wash Filter Cake
Humidify
Banana Rooms

Remember

if the liquid can be sprayed with direct pressure Monarch can furnish the Nozzles.

Send for Catalogs 6 A and 6 C

MONARCH MFG. WKS., INC.
2517 E. Ontario Street
Philadelphia 34, Pa.

Sequence switching is provided as part of the unitized motor-control equipment to allow periodic change in the base-load requirements of any machine in the system. This equalizes wear and permits minor repairs and adjustments to each machine without stopping the automatic cycle. Manually operated multiple pole switches are used, with all wiring and switches installed directly in the motor control cabinets.

In addition to the sizable manufacturing, packaging, storage, and sales areas, the new building is also provided with a modern cafeteria seating nearly 200 persons. There are also laboratories for research and testing, modern pine-panelled offices, a medical department, a machine shop, and a garage.

End (Resume reading on page 75)

Taste-Test Method

—*Continued from page 61*

Two factors tend to disqualify the method for this type use: 1. Large test variations mean a considerable number of observers are required for precision. 2. The type of responses that are called for are expected to change with a number of conditions which cannot always be controlled. And to correct these would again require a larger number of observers in each test than generally are available for quality control work.

Research on this new method is continuing at the Institute with these two main objectives: Improvement of the method itself, and determination of the relative importance of the factors which affect hedonic responses toward food.

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1. Beebe-Center, J. G., *Pleasantness and Unpleasantness*, D. Van Nostrand, New York, 1932.
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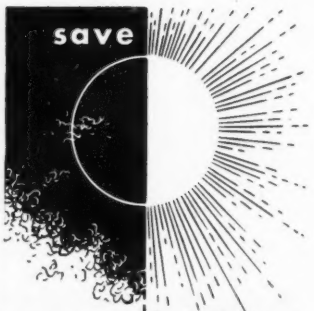
3. Hanson, H. L., Kline, L., and Lineweaver, H., "Application of Balanced Incomplete Block Design to Scoring of Ten Dried Egg Samples," *Food Tech.*, 5, No. 9, 1951.
4. Grant, E. L., *Statistical Quality Control*, McGraw-Hill, New York, 1946.

The above article is taken from the paper, "The Hedonic Scale Method of Measuring Food Preferences," designated as No. 385 in the series reporting research of the Quartermaster Food & Container Institute for the Armed Forces. The Institute points out that the views presented are those of the authors and are not to be construed as necessarily reflecting endorsement of the Department of Defense.

End (Resume reading on page 62)



metal *brightness*

Food plants choose Metso for its effective removal of grease, oil and soil with a *safety margin*. Metso's special property increases cleaning action and also curbs corrosion of metals.

Save your equipment. Keep it bright and clean with Metso.

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MORE IRON AND STEEL SCRAP . . . OF ALL KINDS!

Steel mills and foundries need more scrap.

Not just "production" scrap from metal-fabricating plants . . . but also all sorts of *idle* iron and steel—from all types of plants.

Search *your* plant for this idle metal . . . work with your local scrap dealer to increase supplies of badly-needed iron and steel scrap.

What to look for . . .

obsolete machines, tools and equipment, no-longer-used jigs and fixtures, worn-out or broken chains, wheels, pulleys, gears, pipe, tanks, drums and abandoned metal structures. Non-ferrous is needed, too!

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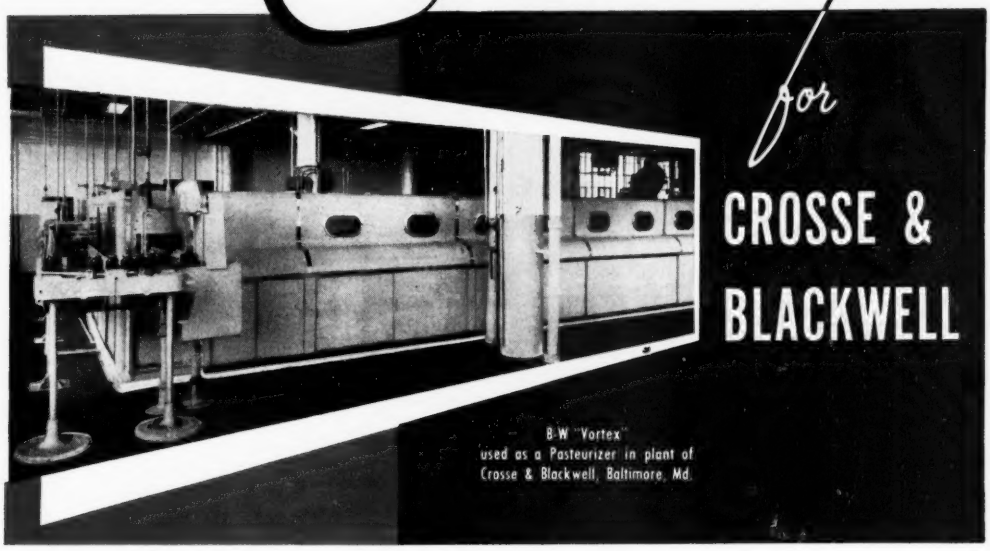
The VORTEX ASSURES ACCURATE, AUTOMATIC, EFFICIENT FOOD PROCESSING—



B-W "Vortex" used as a Pasteurizer in plant of Crosse & Blackwell, Baltimore, Md.

for CROSSE & BLACKWELL

The famous Barry-Wehmiller "Vortex" system of pasteurizing, cooling, heating, exhausting or freezing products packed in glass or metal, provides positive time and temperature control essential to a quality product. Operation is entirely automatic and continuous. Breakage is reduced to a minimum and compact design saves valuable floor space.

The patented "walking beam" conveyor of the "Vortex" simply moves containers, does not move from zone to zone itself, saving the usual cost of cooling and heating a conveyor that moves throughout the processing zones. Atomized sprays accomplish the heat transfer with a minimum of pump horsepower. Hydraulic drive is practically self-lubricating, greatly reducing maintenance work and expense.

Accurate control of time and temperature assure preservation of original flavor, clarity and color of product and longer shelf life.

There are many uses for the highly efficient "Vortex" in many phases of food and beverage processing—available in 53 sizes to fit your space and production requirements. Write for bulletin No. 89.

THE SUN NEVER SETS ON BW BOTTLE CLEANERS, PASTEURIZERS & PROCESSORS

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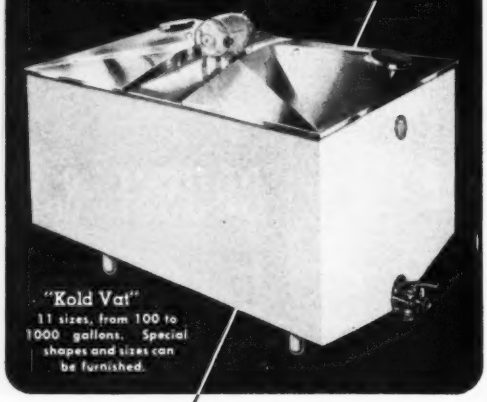
BW IN GREAT BRITAIN WEHMILLER MACHINERY LTD. WITCHAM JUNCTION, SOMERSET

"Kold Vat"

DOES SO MANY JOBS SO RAPIDLY... SO WELL



For example, Cherry-Burrell "Kold Vat" rapidly and thoroughly mixes, blends, cools, and stores an almost endless variety of liquid products. Light syrups and emulsions, extracts, fruit and vegetable juices, flavors, pharmaceutical products and beverages—just to name a few.

And if you need a refrigerated vat, you can have "Kold" surface for freon, ammonia, or refrigerated water. The features below tell why "Kold Vat" saves mixing time, draining time, cleanup time.

Fast Cooling—Mixing: **Shape of vat and agitator produces rapid movement of product over large, refrigerated surface; prevents "patterned" flow; mixes fast without adding air or disturbing product structure.**

Completely Sanitary: **Generously pitched stainless steel lining, large radius corners, cone-type outlet assures fast and complete draining. Outlet and valve meet sanitary codes.**

Easy to Clean: **All stainless product surfaces easy to reach because of low rail and vat dimensions. Hinged, removable covers; removable agitator. No hard-to-clean bottom support agitator bearing.**

For complete information about versatile "Kold Vat," see your Cherry-Burrell Representative. Or Write your Branch or Associate Distributor.

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General Sales and Executive Office:
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Equipment and Supplies for Industrial and Food Processing

FACTORIES, WAREHOUSES, BRANCHES, OFFICES OR DISTRIBUTORS AT YOUR SERVICE IN 36 CITIES

Men & Companies

Paul S. Gerot has been elected board president of Pillsbury Mills, Inc.

Industry

B. & W. Canning Co., Groveland, Fla., plans expanding plant facilities boosting frozen concentrated orange juice to 3,000,000 gal. by summer.

Borden Co. has purchased the Savannah (Ga.) Ice Cream Co. William White will be in charge of local operations.

California Packing Corp. now owns the Grand River Canning Co., Markeson, Wis. The plant will pack peas and corn for Calpak.

Central Tumaco will shortly begin refining sugar cane at its Palmira, Colombia, plant. Capitalization: $2,400,000.

Colony Foods of Virginia, King George, Va., has changed its name to Mount Rose Canning Co. Plant packs pickles, peppers, tomatoes, and relishes.

Consolidated Dairy Products Co., Seattle, has acquired all of Alpine Dairy's properties. Deal was reported closed for $2,600,000.

Esskay Packing Co., Berlin, Md., is now producing up to 50,000 lb. of poultry per day at its newly opened plant.

Foreign Trade Service of Canada announces erection of the first domestic sugar refinery in Ceylon. Cost: $2,700,000.

Godchaux Sugars, Inc., New Orleans, has completed improvements of its refining facilities. Cost: $2,000,000.

Hawaiian Pineapple Co. has a new pineapple juice concentrate plant in Honolulu. Plant should be operative this summer.

Pillsbury Mills is considering a stock and debt financing program to facilitate its expansion program. Projected sum: $10,000,000.

Quaker Oats Co., Ltd., Peterborough, Ont., has named James G. Wharry vice-president and general manager. Fred G. Ash will be general operating manager for Canada.

Southern Dairies, Inc., has completed construction of a new plant in Richmond, Va. Cost: $1,000,000.

Stokely-Van Camp, Inc., recently started production in its new $1,000,000 plant in Dallas. Production of 48,000,000 cans per year is planned.

Swift & Co. has closed its soybean processing plant at Fostoria, Ohio. Operating losses were blamed on variance of raw and finished-product prices.

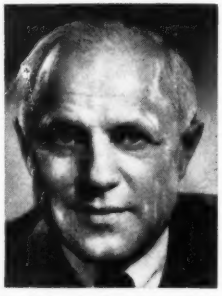
Washington Cooperative Farmers' Assn., Seattle, has awarded contracts for construcion of a poultry plant at Sunnyside, Wash. Cost: $200,000.

The Welch Grape Juice Co. agreed recently to the sale of its properties to its growers who comprise the National Grape Coop. Assn. Price: $15,000,000.

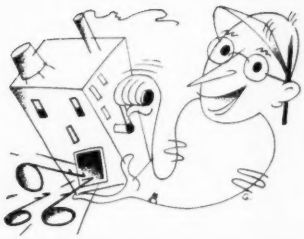
Personnel

Charles H. Bell, family scion, is new president of General Mills, Inc. He succeeds Leslie N. Perrin, retired.

R. C. Cragg has been named general chairman of the Industrial Packaging & Mate-



Dr. Karl T. Compton, chairman of M.I.T., is now also board member of General Foods Corp.



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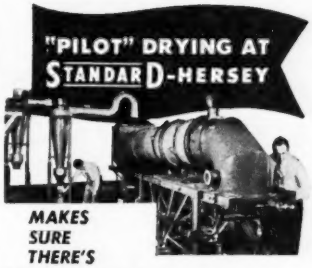

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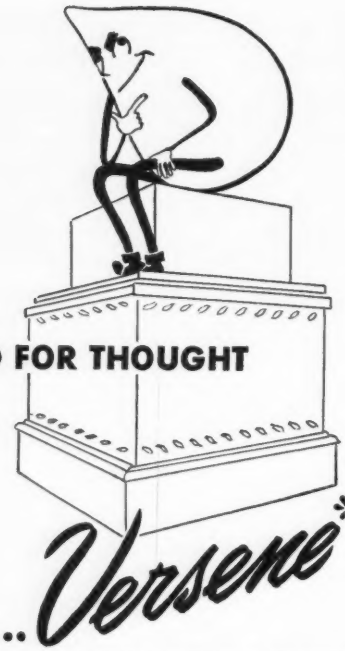

FOOD FOR THOUGHT

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VERSENE* PROTECTS BOTH PRODUCT & PROCESS

Every day more and more spoilage of processed food is being traced to metallic ion contamination. Food chemists know that the best way to prevent it is through the use of Versene. This powerful Chelating Agent controls troublesome Cations by keeping them in soluble complex form. Thus does it prevent "tinny" taste, discoloration, rancidity, loss of shelf-life, fragrance and flavor.

VERSENE*-TOXICITY TESTED

Years of toxicological research, in accordance with suggested procedures of the FDA, prove the safety of Versene when used to prevent metallic ion contamination. When added in the small quantities needed Versene is colorless, odorless and tasteless. Versene is made only by the Bersworth Chemical Company under processes originated, developed and patented by F. C. Bersworth.

VERSENE*-SAFEGUARDS SATISFACTION

Brand satisfaction depends on consistent quality. Versene controls the metallic contaminants that cause spoilage in either process or package. Because it can insure goodness it is worth investigation. Versene has exceptional stability at all temperatures and pH's. Uniformity of complexing power and quality of manufacture are guaranteed. Because of its remarkable synergistic action with quarternaries Versene is ideal for cleaning food processing equipment. Ask for sample and Technical Bulletin No. 2. Write Dept. T.

VERSENE* WATER TEST KIT. Tells Total Hardness in 2 minutes. Accurate to 1 grain per gal. Versenate Method. Complete with instructions $5.00 Postpaid.
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Siegel Chemical Co. – Brooklyn, N. Y. • C. S. Tanner Co. – Charlotte, N. C.
Barada & Page, Inc.
Dallas – Houston – New Orleans – Oklahoma City – St. Louis – Tulsa – Wichita

Thomas W. Simmons, Jr., is now president and general manager of the Johnston Pump Co.

rials Handling Exposition to be held at the Chicago Coliseum, Oct. 14-16.

Dr. Dean Foster now heads the Psychometric laboratory of the U. S. Testing Co., Hoboken, N. J.

John J. Frank, Cincinnati, recently became 22nd president of the American Spice Trade Assn., New York City.

William S. Gipson is now general sales manager for the syrup and candy divisions of Scudder Syrup Co., Chicago.

Guy V. Graham has been named vice-president in charge of salmon operations and sales for Libby, McNeill & Libby.

W. D. Granicher is new president of Pacific Coast Coffee Assn. He also continues as vice-president of Leon Israel & Bros., Inc., San Francisco.

George B. Hamilton has been appointed general manager of the Amino Products Div. of International Minerals & Chemical Corp.

F. L. Hart has been named vice-president and general manager of Dominion Dairies Ltd., Montreal.

Frank Kobe now fills newly created position of research director for Rockwood & Co., chocolate maker.

Louis F. Long, Fredonia, N. Y., has been elected president of Cudahy Packing Co., succeeding F. W. Hoffman, retired.

Art Loose has been put in charge of Houston operations of the Texsteam Corp., maker of safety valves, pumps, and steam generators.

Don L. McGaffey is now president, general manager, and has also been named director of Meyenberg Milk Products Co., Calif.

Samuel S. Moody, Jr., now fills post of field merchandising steward for Norway Sardines of the Norwegian Canners Assn.

James Nash, package designer, is now president of newly formed Package Designers Council, intended to be national in scope.

Roy H. Park has been re-elected president of Hines-Park Foods, Inc., Ithaca, N. Y.

Claude B. Poole, president of C. B. Poole, Inc., Gaffney, S. C., is now also director of the National Candy Wholesalers' Assn.

Russell L. Sears has been elected a vice-president of Lynch Corp. He specializes in packaging machines and refrigeration units.

William O. Whitten has been named president and general manager of Florence Packing Co., Florence, Ala. He succeeds T. T. Hackworth, now chairman.

Edward E. Willkie was recently elected president of Pacific American Fisheries, Bellingham, Wash. He was formerly vice-president of Libby, McNeill & Libby.

Associate Industry

Acme Steel Co. of Canada, Ltd., maker of stitching machines, wire, hoops, and strapping, has begun construction of a warehouse. Cost: $160,000.

American Can Co. expects to build a new plant at Plymouth, Fla. Plant's size: 220,000 sq. ft.

Dixie Cup Co. (Canada) has completed a 65 percent in-

Dr. Henry B. Hass, organic chemist, is newly elected president of Sugar Research Foundations, Inc., and Sugar Information, Inc.

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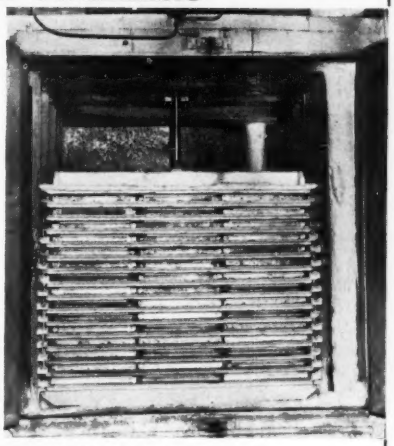

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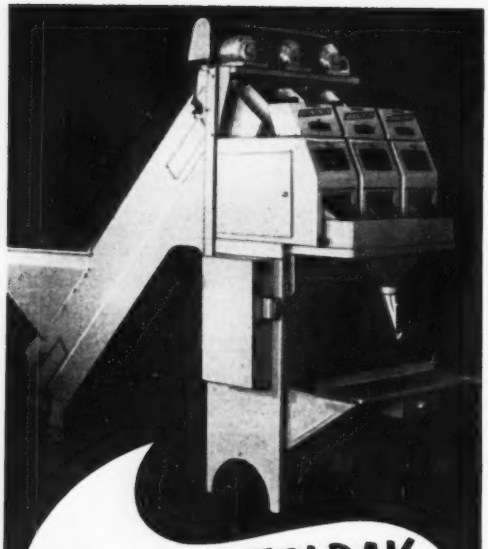

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Daniel W. Murchison will be manager of Borden's newly formed industrial products department.

crease in production and warehouse space.

Fumigation Engineering Corp., Minneapolis, has appointed Milton E. Lindemann to direct its newly created food and industrial sanitation division.

James Dole Engineering Co. announces appointment of James D. Dole as board chairman. H. R. Goff is new president.

Joy Mfg. Co. announces election of William L. Wearly as general sales vice-president.

Labline, Inc., maker of control equipment, has made Donald V. Magnuson director of research and development.

Lear, Inc. has added Clarence J. Reese and Joseph H. McMullen to its board.

Merritt Products Co. will have its plastic specialties division headed by Don Concoy.

Olin Industries, Inc., has purchased Wabash River property in Indiana as possible site for a cellophane plant.

Society of the Plastic Industry, Inc., announces reelection of Gordon Brown as president.

Quaker Rubber Corp. has completed expansion of its rubber-roll covering facilities. Cost: $100,000.

Sharp & Dohme, Inc., has named John G. Bill and Henry W. Gadsden to its board.

Shellmar Products Corp., Mt. Vernon, Ohio, has assumed 99 percent ownership of the Standard Printing Co., Columbus, Ga.

Foster D. Snell, Inc., New York firm of consulting chemists and engineers, has been appointed official laboratory by the Assn. of Food Distributors, Inc.

Thermoid Co., Trenton, N. J., has named Lester F. Cox executive vice-president and manager.

Western Electrochemical Co., Culver City, Calif., now has Robert S. Burns as president.

Westinghouse Electric Corp. has made Howard A. Blair product manager of self-contained products in the Air Conditioning Div.

Roger Williams, Inc., engineering and economic consultant firm, has named Herman W. Zabel as new executive vice-president.

Deaths

Joseph Eros, 55, general manager and secretary-treasurer of Coca-Cola Bottling Co., Baton Rouge, La.—May 10.

Michael Hendler, president of the Borden Ice Cream Co.—June 8.

William F. Jackson, 75, former general manager of the dairy and poultry department of Swift & Co.—May 18.

William Kinnaird, 70, president of Traverse City (Mich.) Canning Co.—May 31.

Carl M. Lurch, 52, president of C. M. Lurch Food Products Co., Lansing, Ill.—May 24.

Lucien R. Simonet, 73, manager for twenty-five years of the American Sugar Refining Co.—May 7.

Arthur R. Wendell, 76, president and general manager of the Wheatena Corp., Rahway, N. J.—May 31.

Jessel S. Whyte, 61, president and general manager of Macwhyte Co., Kenosha, Wis.—May 28.

Morris H. Palmer has been appointed director of manufacturing for Durkee Famous Foods, Division of Glidden Co.

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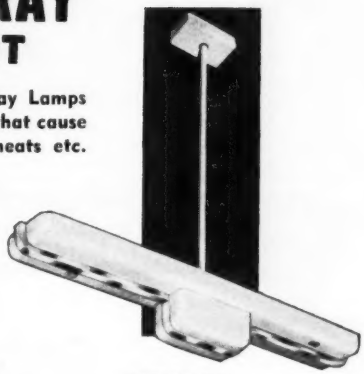

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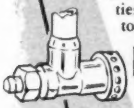

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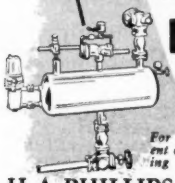

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PRODUCTS

Permanently Flavored Chewing Gum Base Containing Masticable Ingredient Which is a Copolymer of Vinyl Acetate With Flavored Compound Containing an Ethylenic Bond—*R. Heggie, Garden City, N. Y.* No. 2,596,852. May 13, 1952.

Dry Frosting Mix Made of Sugar, Sodium Bicarbonate, and Edible Solid Aliphatic Polycarboxylic Acid of Definite Composition—*D. Melnick, Teaneck, N. J., to The Best Foods, Inc., New York.* No. 2,598,282. May 27, 1952.

Vanillin Made From Waste Sulfite Liquor by Alkalizing and Subjecting to Action of Oxygen at Over 1,000 psi. and 200 deg. C., Rapidly Cooling and Separating—*E. W. Schoeffel, Kronenwetter, Wis., to Salvo Chemical Corp., Rothschild, Wis.* No. 2,598,311. May 27, 1952.

PACKAGING

Preparing Frozen Meat Packages by Filling Container With Meat Pieces, Covering Top with Transparent Sheet, Placing Lid Over Unit, and Freezing in Inverted Position—*C. K. Weisman, Chicago, G. H. Whetzell and G. T. Schjeldahl, Hobart, Ind. to Armour and Co., Chicago.* No. 2,595,498. May 6, 1952.

Apparatus for Packing and Unpacking Jars Into and Out of Cases—*G. Lufkin, to Owens-Illinois Glass Co., Toledo, Ohio.* No. 2,596,339. May 13, 1952.

Confection Package Comprising Rectangular Tube Wrapper With Ridged and Scored End for Easy Opening—*R. Townsend, Greenwich, Conn.* No. 2,596,620. May 13, 1952.

Drying Surface of Wet Containers by Subjecting Rotating Units to Diverging Sheets of Air Under Pressure.—*W. A. Webb, to Food Machinery & Chemical Corp., San Jose, Calif.* No. 2,596,800. May 13, 1952.

Separable Mold for Shaping and Amalgamating Meat Pieces Into Frozen Unit—*G. A. Minder, Bremerton, Wash.* No. 2,597,592. May 20, 1952.

PROCESSES

Skinning Carcass by Loosening Skin at One Edge, Turning it in a Rearward Position, Holding it Against Forward Movement, Permitting Meat to Turn as Skin is Removed—*F. J. Coad (deceased) by Mrs. F. J. Coad (administratrix), Des Moines, Ia. to Swift & Co., Chicago.* No. 2,587,967. Mar. 4, 1952.

Concentrating Orange Juice Without Loss of Volatile Flavor Constituents by Partially Freezing, Separating the Ice, Removing Soluble Solids and Liquor From the Ice, Evaporating, Then Adding Residue to Initially Removed Concentrate—*G. Sperti to the Institutum Divi Thomae Foundation, Cincinnati, Ohio.* No. 2,588,337. Mar. 11, 1952.

Preserving Color in Canned Green Vegetables by Adding Alkaline Calcium Sucrate to Preserving Liquid—*G. H. Bendix and R. E. Henry, Park Ridge, and N. H. Strodtz, Eola, Ill. to Continental Can Co., Inc., New York City.* No. 2,589,037. Mar. 11, 1952.

Retarding Reversion in Hydrogenated Fats and Oils by Contacting With Activated Alumina, Active Aluminum Silicate, Calcium Hydroxide, Zinc Oxide, and Calcium Oxide, in Absence of Oxygen, Separating and Hydrogenating—*W. Lange, Cincinnati, and R. G. Folzenlogen, Columbia Township, Ohio to The Proctor & Gamble Co., Ivorydale, Ohio.* No. 2,589,097. Mar. 11, 1952.

Removing Oil From Vegetable Material by Comminuting, Mixing with Cation Exchange Resin to Change Insoluble to Soluble Organic Substances, Dissolving in Water, Separating the Resin, Then Recovering the Oil From the Remaining Mixture—*A. E. Eriksen, Delhi, Calif.* No. 2,589,238. Mar. 18, 1952.

Making Liquified Fish by Contacting Components With Acid and Atmosphere of Steam at High Temperature and Pressure Until Particle Size is Below 50 Microns—*J. Ryan, Brookline, and W. C. Wilson, Beverly, Mass. to Dehydrating Process Co., Boston.* No. 2,589,287 and 2,589,288. Mar. 18, 1952.

Controlling Color and Flavor of Potato Chips by Immersing Slices in Sulfur Dioxide-Containing Bath, Washing in Water, Immersing in Aqueous Solution of Reducing Sugar and Protein Hydrolyzate Derived from Raw Potatoes, Then Drying—*P. A. Xander, Nescopeck, Pa. to Wise Potato Chip Co., Berwick, Pa.* No 2,589,591. Mar. 18, 1952.

Oil and Food Products From Herring, Whales, and Other Sea Animals by Heating With Steam, Separating Glue Water From Un-

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dissolved Solids, Evaporating the Latter to Produce Pressure Steam Which is Used to Heat the Raw Materials—*M. Fladmark, Oslo, Norway.* No. 2,590,303. Mar. 25, 1952.

EQUIPMENT

Dispensor for Lard and Other Semi-Solids Having Vertical Cutting Element With Radial Portions Defining Area of Slug of Material and Lateral Cutting Elements That Provide Support Following Cutting Operation—*L. N. Duncan, Oklahoma City, Okla.* No. 2,589,066. Mar. 11, 1952.

Volume Coffee-Making Apparatus Comprising Self-Dumping Centrifuge Automatically Fed Predetermined Charges of Water and Ground Roasted Coffee—*L. Burgess, Jersey City, N. J.* No. 2,589,335 and No. 2,589,336. Mar. 18, 1952.

Machine for Whipping Candy Batches With Shaft Driven Rotating Beaters and Fixed Batch Breaking Members Suspended From Removable Cover—*J. Higgens and N. Fiorella to Illini Whipper Co., Chicago.* No. 2,589,381. Mar. 18, 1952.

Biscuit and Cracker Cutting and Embossing Machines—*J. E. Weidenmiller, Lincolnwood, and R. M. Weidenmiller, Skokie, Ill. to Edward Weidenmiller Co., Inc., Morton Grove, Ill.* No. 2,589,907-08. Mar. 18, 1952.

Machine for Enrobing Confection Centers With Plastic Coating and Thereafter Embedding Hard Edible Units Within Said Coating—*W. P. Spain, Villa Park, Ill. to E. J. Brach and Sons, Chicago.* No. 2,590,051. Mar. 18, 1952.

Doughnut Machine With Spiral Cooking Vessel Containing Quantity of Externally Heated, Volumetrically Pumped Cooking Oil—*F. W. Corbett, Burbank, Calif.* No. 2,590,157. Mar. 25, 1952.

Candy Cleaning Machine to Remove Fine Powdered Material From Molded Candies by Means of Rotating Brush Within Hollow Drum—*H. W. Currie, Skokie, Ill. to Currie Manufacturing Co., Chicago.* No. 2,590,381. Mar. 25, 1952.

Method of Improving Cacao Product by Mixing Plastic Mass of Vegetable Protein Hydrolysates With Cacao Bean Material Milling, Powdering, Expressing Fat Therefrom, and Drying—*E. K. Pettibone, San Francisco, Calif.* No. 2,590,646. Mar. 25, 1952.

Automatic Dough Panning Machine With Air-Operated Dispenser Actuated by Movement of Pieces of Dough Along Conveyor—*H. C. Rhodes, Portland, Ore. to Read Standard Corp.* No. 2,590,823. Mar. 25, 1952.

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High Power Magnetic Separation is new offering compiling numerous catalogs and bulletins on the subject. Applicable in wet and dry processes, units discussed number more than 20 and range from agitating drums to permanent magnets. Highly comprehensive. 88 pages.—*Magnetic Engineering & Mfg. Co., Clifton, N. J.*

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Centrifugal Sump Pumps

Bulletin WQ-220 illustrates and describes wet and dry pit-type sump pumps. Centrifugal units are adaptable to clear liquids as well as sewage and other liquids containing solids. Sizes are 1½ to 16 in., with capacities up to 3,000 gpm. Pressures obtainable range to 250 psi. 8 pages.—*Warren Steam Pump Co., Inc., Warren, Mass.*

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Units for Air

Extensive unit coverage for various aspects of air conditioning is given via folder containing many bulletins. Discussed are air washers, exhaust, ventilating, and mechanical draft fans, vortex controllers, and other units. 126 pages.—*Clarage Fan Co., Kalamazoo, Mich.*

Circle L205C on Reader Service Card

Single-Pass Evaporator

Company publication, designated No. 7, describes evaporator, application being of continuous, turbulent thin film concentrate in a single pass said to require but a few seconds. 4 pages.—*Rodney Hunt Machine Co., Mill St., Orange, Mass.*

Circle L205D on Reader Service Card

All-Weather Motors

Foldout No. 400 presents facts on motor designed for use under diverse weather conditions. Features are undercoated steel parts, rust-inhibited rotors, and full end-protection. 6 pages.—*Robbins & Myers Inc., Springfield 99, Ohio.*

Circle L205E on Reader Service Card

Power Drives

Catalog comprehensively discusses electric power drives, and there are illustrations. Motors are of totally enclosed, pipe-ventilated design. 20 pages.—*Sterling Electric Motors, Inc., 5401 Anaheim-Telegraph Rd., Los Angeles 22.*

Circle L205F on Reader Service Card

Liquid Blender

Construction, operation, and flexibility of blending unit are keynoted in bulletin *Precision Blending System.* Used for compounding, mixing, or blending beverages, coolants, liquid foods, and other liquids. 12 pages.—*Bowser, Inc., Fort Wayne, Ind.*

Circle L205G on Reader Service Card

Steam Generator

Forced recirculation principle is feature of steam generator described in recent well-illustrated bulletin. Applications aim at reducing costs while supplying dependable volume of steam at constant temperature and pressure ratings. 12 pages.—*Clayton Mfg. Co., El Monte, Calif.*

Circle L205H on Reader Service Card

Gravimetric Feeder

Used for dry materials, gravimetric feeder is fully described in Bulletin 30-H12. Advanced factors stressed include feeding range, vibratory mechanism, control of feed rate, and scale system. Accessories are also listed. 4 pages.—*Omega Machine Co., Providence 1, R. I.*

Circle L205I on Reader Service Card

Air Diffusers

Technical data for simplifying choice of proper air diffusers in air conditioning systems are topic of Manual 40. Included are pertinent photos, tables, and case examples. 64 pages.—*Anemostat Corp. of America, 10 E. 39th St., New York 16.*

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Gear Motors

Up to 61 standard models of fractional-horsepower gear motors are considered in Bulletin GEA-5678. Outlined is method for determining horsepower requirements with use of ordinary pipe wrench and scale. 8 pages.—*General Electric, Schenectady 5, N. Y.*

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Deaerating Heaters

Principles of deaeration and essential elements of deaerating heaters are explained in Bulletin WC-106. Tray-type and spray tray-type heaters are described in tabular form, with parts identified in adjacent drawings. 10 pages.—*Graver Water Conditioning Co., 216 W. 14th St., New York 11.*

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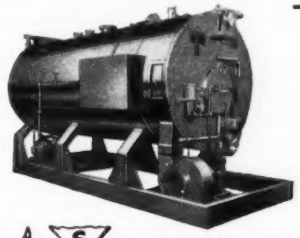

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FUEL — 80% Guaranteed Efficiency

LABOR — Minimum Attention Required

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BOX F-7, OSWEGO, N. Y.
Builders of Better Boilers since 1848
Manufactured under License in Canada by VOLCANO, Ltd., Montreal, P. Q.

SAFE REFRIGERATION in the Food Industry

Winery chills 75,000 gallons to 18° F. with "FREON" charged equipment

In the famed winery of G. F. Heublein & Bros., Inc., Hartford, Conn., plastic-coated concrete vats have replaced old wooden storage casks. The new vats hold some 75,000 gallons of chilled wine . . . save 30% floor space . . . eliminate evaporation and leakage, and are easily cleaned. They allow the wines to settle before filtration and bottling. Wines treated in cellars are then chilled from room temperature to about 18°F. The method used is one of controlled wine circulation through a refrigeration unit with tubes containing "Freon" refrigerants. Thermometers at inlet and outlet ends enable an operator to control the wine temperature.

VALUE OF "FREON" REFRIGERANTS

Because "Freon" refrigerants are safe . . . noncombustible, nonexplosive and virtually nontoxic . . . they are ideal for use in wineries and throughout the entire food industry. There are various types and sizes of "Freon"-charged equipment, and the machines are adaptable to every refrigeration need in freezing, processing and storing food products. Multiple-unit installations are frequently used. They're easily operated, conserve space and provide dependable, low-cost refrigeration that meets a wide variety of requirements.

Whether you are planning a new plant . . . or expansion or modernization of a property already built . . . be sure to consider "Freon"-operated equipment. These refrigerants help safeguard your investment. They insure economical, trouble-free performance of refrigeration machines over long periods of time. Call or write any leading manufacturer of equipment or address: E. I. du Pont de Nemours & Co. (Inc.), "Kinetic" Chemicals Division, Wilmington 98, Delaware.

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Pipeline Strainers

Complete line of pipeline strainers in sizes ¼ to 3 in. are described in Bulletin 252. Specifications and prices are included, along with facts on costs, cleaning features, and operational characteristics. 4 pages.—*V. D. Anderson Co., 1935 W. 96th St., Cleveland 2.*

Circle L207A on Reader Service Card

Speed Reducers

Double-worm and helical-worm gear speed reducers are covered in Bulletin G-WWH. Complete data is included on horsepower, output torque, and center distances for reductions up to 6,400:1. 48 pages.—*De Laval Steam Turbine Co., Trenton 2, N. J.*

Circle L207B on Reader Service Card

Control Equipment

Fluid Meter

Batching light or heavy liquids is task performed by fluid meter explained in Bulletin FL-49. It is reported highly accurate on any type heavy duty service. Practical applications of unit are given. 8 pages.—*Hetherington & Berner Inc., 701-745 Kentucky Ave., Indianapolis 7.*

Circle L207C on Reader Service Card

"CP" Thermometer

Catalog 6020 outlines unique advantages in utilizing cam programmer thermometer. Processes which must be carried out with fixed relationships between time and temperature are effected directly. Maker reports flexibility in keeping with modern instrumentation. 12 pages.—*Minneapolis-Honeywell Regulator Co., Wayne and Windrim Aves., Philadelphia 44.*

Circle L207D on Reader Service Card

New Scale

Well-presented folder, Form 668, gives information on scale stated to combine a score of new features. It is shown how unit can be attached to a beam scale to make operation automatic. Graduations and figures are large, there is no lost motion, and life expectancy is reported high.—*The Howe Scale Co., Rutland, Vt.*

Circle L207E on Reader Service Card

Ratio Totalizer

Just issued is Bulletin 5452 giving information on new ratio totalizer. Having a pneumatically operated control mechanism, it is applicable for combining input control pressures and spring forces, and producing output control pressure based on mathematical computations of input control signals. 8 pages.—*Hagan Corp., Hagan Bldg., Pittsburgh 30.*

Circle L207F on Reader Service Card

Meat Sanitation

Booklet *Sanitation Control in Meat Packing Plants* details cleaning methods for kettles, conveyor belts, molds, grease traps, tanks, filter cloths, drums, boards, boxes, shrouds, etc. Chapters dealing with curing and chicken eviscerating departments are included. 16 pages.—*The DuBois Co., Cincinnati.*

Circle L207G on Reader Service Card

Temperature Controls

Full line of controls for temperature are featured in Catalog G-17. Four new instruments are noted, with tables on application and performance. Covered are controls for −300 to +1800 deg. F. applicable under various severe conditions. 12 pages.—*Burling Instrument Co., 5 Vose Ave., S. Orange, N. J.*

Circle L207H on Reader Service Card

Materials Handling

Fork Truck Case Study

Action photos illustrate Report 292 in presenting fork trucks at work on a company's bottling line and in shipping-receiving operations. Folder lists services performed and summarizes benefits.—*The Baker-Raulang Co., Baker Industrial Truck Div., 1230 W. 80th St., Cleveland 2.*

Circle L207I on Reader Service Card

Fork Truck Series

Bulletins 1579, 80, and 81, give facts on fork-lift trucks with 3,000 to 4,000 lb. capacities. Models are both gas powered and diesel powered.—*The Buda Co., Harvey, Ill.*

Circle L207J on Reader Service Card

Packaging Machines

Attractive catalog presents packaging machine line plus information on special-type cartons for many uses. Units discussed range from folding-box glueing machine, roll puncher, banding machine, and printing unit to sealing press, filler, and weighing machines. 20 pages.—*Jagenberg-Werke Akt., Alfred Hofmann & Co., West New York, N. J.*

Circle L207K on Reader Service Card

High-Lift Truck

Total of 1,000 lb. is load of lift truck described in Leaflet 242. Offered is model having non-telescopic height of 60 in. and also telescopic unit which elevates to 108 in.—*The Raymond Corp., 6290 Madison St., Greene, N. Y.*

Circle L207L on Reader Service Card

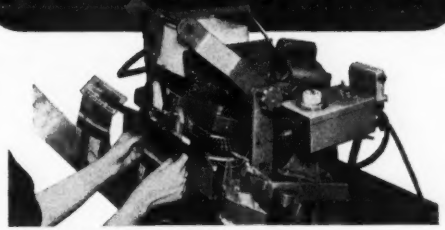
Anent Packaging Units

Bulletin describing plant use of

LABEL SEAL-IT

with new vacuum pick-up

Simplifies Bag Sealing and Labeling!



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In steam heated processes, output is increased if air is vented from the steam space.

The *rapid* removal of both large volumes of air and condensate are features of the

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The powerful thermostatic bellows permits the use of an OVER-SIZE orifice and this orifice is **WIDE OPEN** when the trap is cold.

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Typical of Thermoid's quality and attention to detail are the conveyor and elevator belts made specifically for canners and other food handlers. They are acid resistant. Impart no taste or odor to foods being processed whether fruit, fish, meat or vegetables.

Thermoid belts are built to stay on the job—day in, day out. Handle peak loads and avoid costly breakdowns that result from the use of ordinary belting.

Call your Thermoid distributor to help you select the belt that will serve your needs most economically. Or write direct for a copy of Thermoid Conveyor Belting Catalog No. 3679. The right Thermoid belt in the right place will do the job *better*.

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packaging machines continues with detailed description of machine types and applications. System of purchasing units is outlined. 4 pages.—*Package Machinery Co., Springfield, Mass.*

Circle L207M on Reader Service Card

Conveyor Belts

Nine Ways to Simplify Production and Maintain Sanitary Requirements In Ice Cream Plants is title of bulletin just released. It shows, in flowsheet form, how woven-wire conveyor belts are used in making bulk ice cream, ice-pops, and ice cream sandwiches. —*The Cambridge Wire Cloth Co., Cambridge, Md.*

Circle L209A on Reader Service Card

Plant Supplies

Plastic Compound

Primarily used in repairing conveyor belts, plastic rubber compound is described fully in Form 201-2-52-35M. Giving a protective coating, lining, or resurfacing, material may also be applied to chutes, flumes, mixing tubs, floors, cabinets, and similar items. Foldout.—*Magic Chemical Co., 121 Crescent St., Brockton 2, Mass.*

Circle L209B on Reader Service Card

Neoprene Treatment

Brochure *Neoprene Treated Paper* describes advantages in adding small percent of neoprene rubber latex to paper pulp. Resultant paper is said to be of higher wet strength and internal bond and impact strength, also more chemically resistant. Application is in cartons, wrapping, and packaging paper. 12 pages.—*E. I. du Pont de Nemours & Co., Public Relations Dept., Wilmington, Del.*

Circle L209C on Reader Service Card

Protective Film

Amber liquid which dries to form protective film is subject of Bulletin B-25-11. Coating is termed tough and resilient rather than rigid and brittle. Intended for heavy duty use, material is designed to stop deterioration. 24 pages.—*Tropical Paint & Oil Co., Cleveland 2.*

Circle L209D on Reader Service Card

Plastic Paint

Bulletin 201 notes characteristics, applications, and methods for use of corrosion-resistant plastic paint now available. Explained are procedures for painting metals, concrete, brick, stone, plaster, and asbestos board. 8 pages.—*The Corrosite Corp., 405 Lexington Ave., New York 17.*

Circle L209E on Reader Service Card

Nylon-Lined Bearings

Operating principles, design, advantages, and application of nylon-lined bearings are set forth in illustrated bulletin. Used for rotation and reciprocation applications. 4 pages.—*Thomson Industries, Inc., Manhasset, N. Y.*

Circle L209F on Reader Service Card

Miscellaneous

Roofing Material

Maintenance of roofs is concern of booklet *Solving Roof Problems.* Photos, drawings, and diagrams explore topic, describing roof types, how they are built, roof deterioration, and how roof troubles can be diagnosed and treated. 32 pages.—*Tremco Mfg. Co., 8701 Kinsman Rd., Cleveland 4.*

Circle L209G on Reader Service Card

Microfilm Reader

Projection of images on wall or screen are two methods for employing new portable microfilm reading unit shown in Leaflet F263. Also offered is desk-top screen.—*Remington Rand Inc., 315 Fourth Ave., New York 10.*

Circle L209H on Reader Service Card

Record Disposition

Basic plan for record retention and destruction is subject of new brochure. Designated No. 1200, this publication covers details such as record classification and handling, and includes chart showing types of records and time element of retention. 24 pages.—*Remington Rand Inc., 315 Fourth Ave., New York 10.*

Circle L209I on Reader Service Card

Electrical Maintenance

Booklet offering complete maintenance service for electrical apparatus is now available. Photos show testing devices and repair equipment at strategically located repair plants. 24 pages.—*Westinghouse Electric Corp., 306 Fourth Ave., Pittsburgh 30.*

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For your convenience, too, all items in this department are listed and keyed in the Reader Service Section.

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Ideal for Dairy and Food Industries

The Strahman Spray Nozzle does a better job with the least amount of water. This precision made nozzle enables the operator to get any type stream of water to do his job by simply pressing the lever. A soft spray is sent forth with slight pressure on the lever, and a strong straight stream may be had by pushing the lever all the way down. This convenient control of the wash water assures better cleaning with a lot less effort. The nozzle automatically shuts off the moment the lever is released, thereby eliminating all waste of water. *List Price $17.50*

RENEWABLE RUBBER COVER. The sturdy cover protects the nozzle and your equipment against knocks and dents. When the cover becomes worn, replace it with a new one.

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makes foods
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Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.

Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

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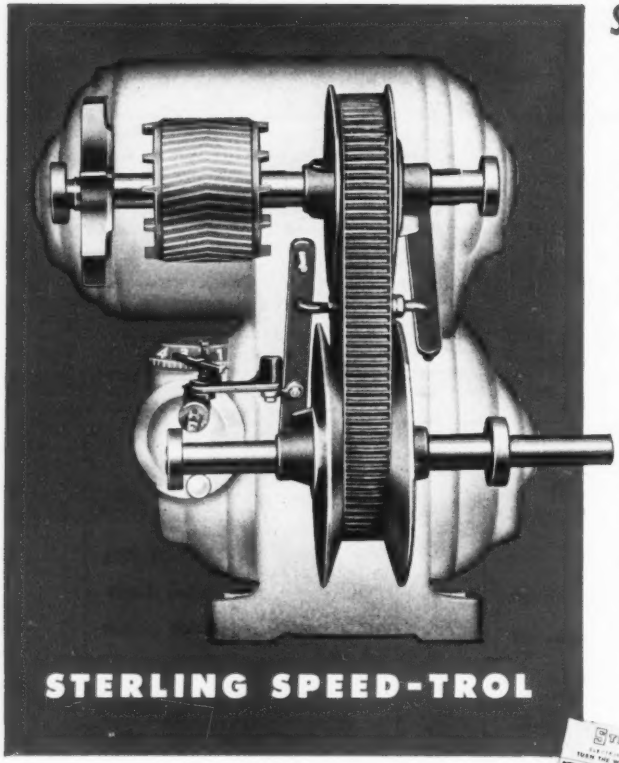

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Through use of Speed-Trol variable speed drive on a screw conveyor for loading a 45-ton bucket elevator, The Red Top Gin Co., Blytheville, Ark., is able to more efficiently process both green and dry soy beans. With Speed-Trol we maintain full capacity production throughout the soy bean season and have increased production 50%, reduced spoilage 20%, decreased labor costs 30%, and greatly improved employee morale, reports A. J. Boyt, Foreman.

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EQUIPMENT ADAPTATION TO: Sequence synchronization—operators' abilities—load variations due to differences in quantity, quality, weight, size, tension, hardness or shape of material to be processed, machined, conveyed, blended, mixed, etc.

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OTHER STERLING ELECTRIC POWER DRIVES:
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P-4512, Food Engineering
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For position in expanding technical department. Opportunity for graduate mechanical or chemical engineer with experience in plant layout or sales, preferably in the food industry. Give personal history, experience, education and references. Salary commensurate with ability and experience.

Write R. R. Rammel
FOOD MACHINERY & CHEMICAL CORPORATION
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Canadian House desires to contact expert qualified to advise on the most recent extraction and blending procedures. Replies treated in confidence.

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RESEARCH EXECUTIVE. Large Eastern Food Manufacturer has opening for Research Executive. Should have Ph.D. degree in Chemistry or Biochemistry although degree is not as important as demonstrated research accomplishments. Must have at least 5 years experience in directing active research program, part of this time at the project level. Must have demonstrated executive ability, be aggressive and have leadership qualities necessary to keep active research program moving at top speed. Age 35-45. Submit complete resume, salary requirements and recent photograph in first letter. P-4535, Food Engineering.

TECHNICAL WRITER-Chemical Engineer, or equivalent, with writing ability for sale promotional work with a major instrument manufacturer in Eastern United States. Training or experience in food processing and technology and/or process instrumentation desirable, although not mandatory. Please reply stating complete qualifications to JP-50, P. O. Box 3575, Philadelphia 22, Pa.

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REPRESENTATIVES WANTED. Incandescent, Fluorescent, infra-red heat, photo-flood and photo-flash lamps. Also renewable cartridge and plug fuses, solderless wire connectors and fluorescent starters. Many choice territories available. Send replies to RW-4529, Food Engineering.

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SALARIED PERSONNEL $3,000-$25,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F, 241 Orange St., New Haven, Conn.

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FOOD CHEMIST, Ph.D., Physical Chemistry. Experience in Fundamental and applied research in food field. Executive position desired. N. Y. area preferred. PW-4700, Food Engineering.

(Continued on the following page)

A once-in-a-lifetime opportunity for an experienced food merchandiser

A substantial, long established company with an international business is looking for an experienced merchandiser. The man we are looking for is probably successfully employed by a food processor, wholesaler or chain. He is now looking for a larger opportunity. He must have training and experience in food display, store planning and preferably—although not essential—have experience in commercial refrigeration. He must be free to travel. Please write fully covering your experience. Your replies will be held in strictest confidence. Our own staff knows of this advertisement.

P-4470, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

COMMISSARY MANAGER

Exceptional opportunity for well-trained and qualified Commissary and Food Specialist to direct food activity and supply for a large foreign operation of an American-owned Company. Service headquarters located in New York. Applicants must be thoroughly experienced in the fields of Commissary Management and Food Supply, with at least 15 years continuous experience in these lines, and must have attained Management Capacity. Forward full qualifications, record, references, salary requirements. Attach small photo or snapshot.

FOOD BUYER

Buyer experienced in the purchasing of meats, vegetables, canned goods and other staples, needed to serve on staff of Commissary Manager (see above). Must be thoroughly qualified in knowledge of food purchasing activity. Mail full qualifications, record, references, salary requirements. Attach small photo or snapshot.

P-4590, Food Engineering
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(Continued from preceding page)

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FOOD TECHNOLOGIST, specialist in every phase of manufacturing of Soda Fountain products, including pulpy fruit drinks, true fruit and imitation flavored syrups, extracts, fudges and fruit toppings, hot chocolate powders, etc. 15 years experience as Creative Chemist and Production Manager of entire line for a large northeast firm. Creator of many items now popular on the market. Seeking production opportunity in similar or allied fields consistent with experience. Age 36, B.S., Registered Pharmacist. Salary and Location open. PW-4673, Food Engineering.

PRODUCTION MANAGER for food plant. Thorough experience in management and administration, plant installation, sugar products development work. PW-4400, Food Engineering.

RESEARCH & PRODUCTION Chemist, with wide experience in many phases of manufacture and development of confectionery, chocolate, many desserts, cereal products and other foods, desires position of responsibility to fully use his ability. PW-4690, Food Engineering.

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IMPORTANT FRENCH Company specialist in food machinery and equipment manufacturing, with large possibilities in production and sales, would be interested by exclusive licenses of new machines or equipments in food industris for France and European countries. Address S.E.I.L.A. 16, rue Chauveau Lagarde-Paris (8) France.

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Quality Control staff of progressive Chicago food manufacturer can use college grad. with degree in physical science or food technology. Experience desired but not necessary. Age 21-28. Excellent opportunity if you qualify. Submit complete personal data, education, married status, work record, recent snapshot and telephone number.

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Food Processing Equipment including Aluminum and S/S Kettles, Mixers, Vacuum Pins, Dehydration equipment, Grinders, Elevators, Stills, Colloid Mills, Conveyors, Filters, Packaging Units, Wrapping Machines. Will consider a set up plant now operating or shut down. When offering give full particulars.

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Complete Cheese Processing Equipment

Capacity 6,000 to 8,000 pounds per hour, consisting of swivel cleaning tables, emulsifying table, conveyors, stainless steel 2-worm grinder, stainless steel horizontal cooker, 2 and 5 pound convertible stainless steel filler and stainless steel pouch former.

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PULVERIZERS
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POWER FEED NET WEIGHER
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6—Devine #28 Vacuum Shelf, each 20 shelves 59" x 78".
1—5' x 33' Rotary Vacuum.
3—6'x50' Louisville Rotary Steam Tubes.
1—4'x8' Flaker or Cooling Roll.
6—Atmos. Double Drum Dryers—1—B & C 28"x60"; 4—Buflovak 32"x90" & 32"x72"; 1—Buflovak 42"x120".

MIXERS, Dry Powder

2—Kilby jack, ribbon, 450 cu. ft.
1—Howes 3000# dbl. ribbon.
1—Day Size F 1850#; 1—Munson Rotary 1000# batch; 2—Day Size D8 800#; 2—Broughton 700# & 1500#; 2—Jabez Burns 500#, ribbon.

MIXERS, Miscellaneous

4—B.P. 3000 gal. jacketed Mixers, size 30, type X-BS. Size 24, type X-BS.
1—B.P. 1200 gal. unjacketed.
1—BP 625 gal. Size 21 type X-BB; 3—350 gal.; 1—100 gal. Vacuum size 15 type VII-BB; 1—100 gal. size 15 type VI-BB; all jacketed.
1—Day size 30 Imperial unjacketed 75 gal. S/S lined S/S blades.
2—Reed 40 & 50 gal. double arm Mixers.
1—Fitzpatrick Comminuter, Model D jack., mtr, vibrating feeder.

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1—Swenson Triple Effect Evaporator, 1320 sq. ft. total. With copper tubes, steam pumps, condenser and piping.
1—Swenson Single Effect, copper tubes, 440 sq. ft., condenser, pumps, etc.

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1—U. S., Jr. Model Colloid Mill, 50-60 GPH, with 2—3 HP motors.
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1—"Selectro" 3'x6' Double Deck, Vibrating Screen. Rebuilt.
1—"Selectro" Single Deck Vibrating Screen 3'x8'; 1—1½'x5', rebuilt.
1—Day S/S Single Deck, 40"x84".

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4—World & Ermold Semi Automatic; 2—World Rotary Automatic; 3—Burt Adjustable; 6—N. J. Pony Labelrites.

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20—Sperry 18"x18" c.i., closed del., P & F, 11 chambers.
7—Filter Presses from 7"x7" to 42"x42" Cast Iron, Plate & Frame, Recessed, Open and Closed deliveries.
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8—Oliver Vacuum Filters, incl. 8'x12', 11'6"x 14', 11'6" x 18'.

KETTLES

28—Aluminum Jacketed Kettles, from 50-500 gal., some agitated.
13—S/S Jacketed Kettles, from 30 to 300 gals., some agitated.
18—Copper Jacketed, from 25-600 gals.
8—Dopp C.I. jacketed 100, 150, 350 & 600 gal.; 3—150 gal. double motion agitated & jacketed.
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2—500 gal. steel, jack., closed, agit. Reactors, 125# jacket, internal pres., & full vac., m.d.

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2—42" Amer. Tool & Machine Co. S/S Centrifugals, 40 HP motor.
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Stokes, 4'x9', Atmos., double drum.
Proctor & Schwartz 24"x28'9" Conveyor Dryer.
Proctor & Schwartz, 8'x94', SS Conveyor Dryer.
5'x67'x5/16" Dryer with lifters.
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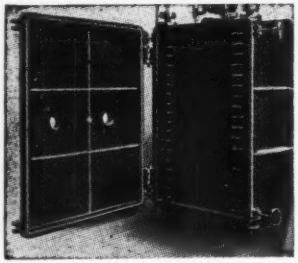

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3484	Rietz Rd 18 Stainless Disintegrator; 30 HP
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3484A48	M. & S. 10 Pocket Stainless Rotary Fillers
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35—Stainless Steel Tanks, 30, 60, 100, 150, 200, 300, 400, 500, 1000, 1400, 2350, 3000, 4200 and 5700 gal.

5—Aluminum Tanks, closed, 275, 500, 1350 gal.

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1—International 12 spout automatic Vacuum Filler, Stainless.

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1—Baker Perkins Type 17½ RVM double arm, jacketed Mixer 325 gals. new.
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2—Rotex Sifters 40"x84", 40"x104".
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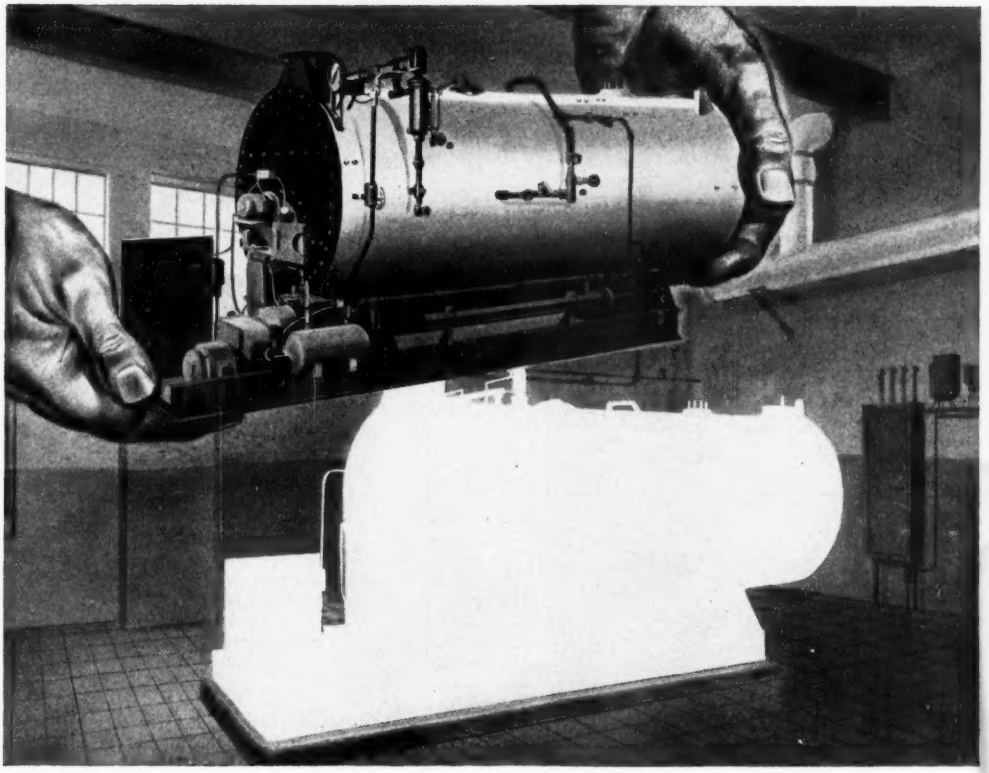

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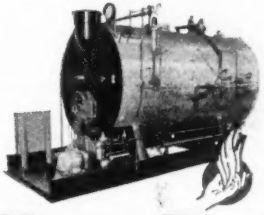

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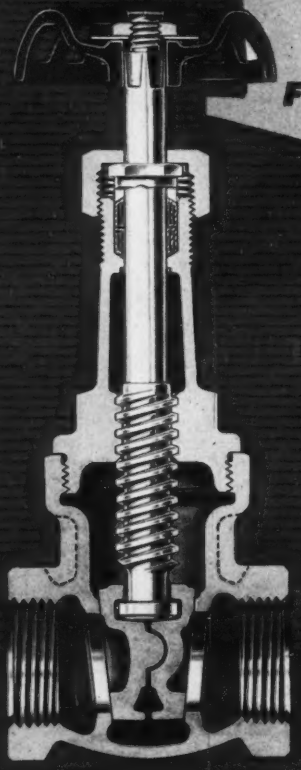

STEMALLOY

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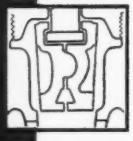
You can repack while the valve is wide open and under pressure. Perfectly machined backseating surfaces are located above stem threads where scale does not collect.



STAY-ON DISCS

Double-wedge disc sections are pressed against bonnet when valve is fully opened, won't fall out when bonnet assembly is removed.

HEXAGON HEAD GLAND

Six faces are provided for secure wrench grip to loosen and raise gland. No more troublesome prying, as with old-fashioned round type.

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Choose a rising or non-rising stem; double-wedge, solid wedge, or single-wedge disc. Switch trim for any service, and provide new parts as you need them. With these valves in stock, you keep inventories low —yet never have shortages.

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Circle numbers of products you want to know more about; fill in your name, position and address; drop card in mail (no postage required). We tell companies what you want and they reply to you.

TO MAKE IT HANDY

Below is an alphabetical list of products and new literature described in advertisements and the following regular departments: New Equipment and Supplies; New Packages and Products; and Just Off the Press.

WHAT THE NUMBERS MEAN

The number after each item in the list is the number of the page it appears on. Where more than one item is described on a page, prefix capital letters indicate position: L,R,T,B,C (left, right, top, bottom, center). Small letters are used to separate several products described in an advertisement. Capital letters following page numbers identify products and literature described in monthly editorial departments.

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For Food Plant Employees and Consultants Only

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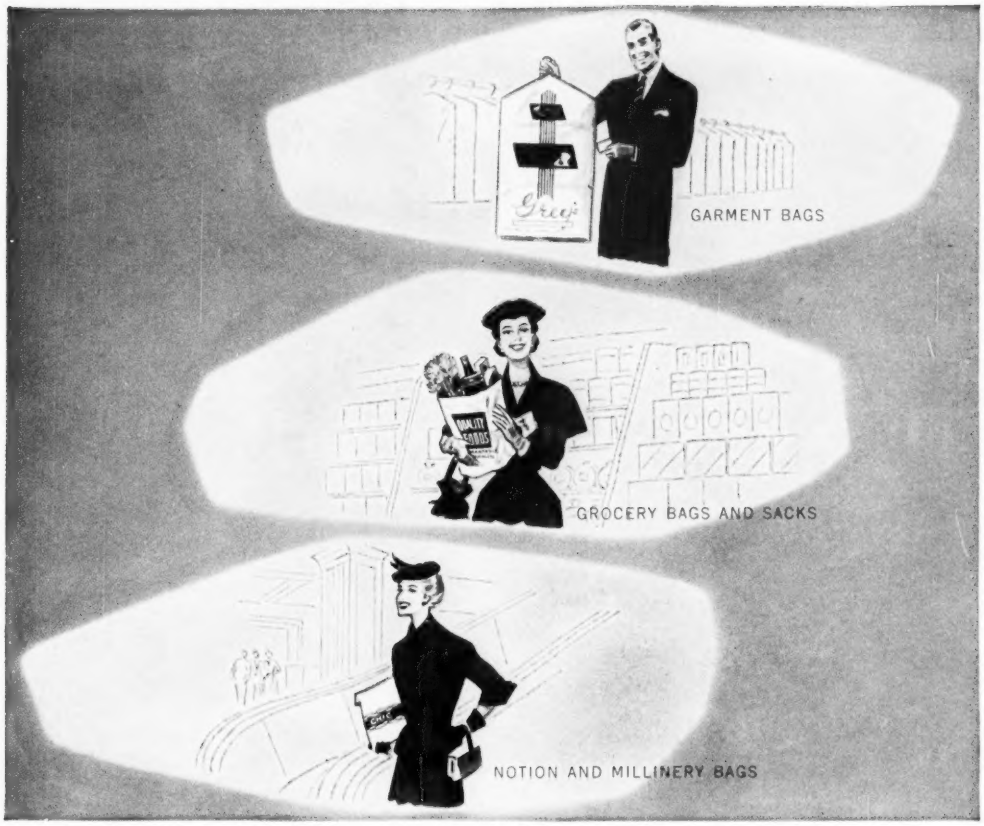
FOOD ENGINEERING

JULY, 1952



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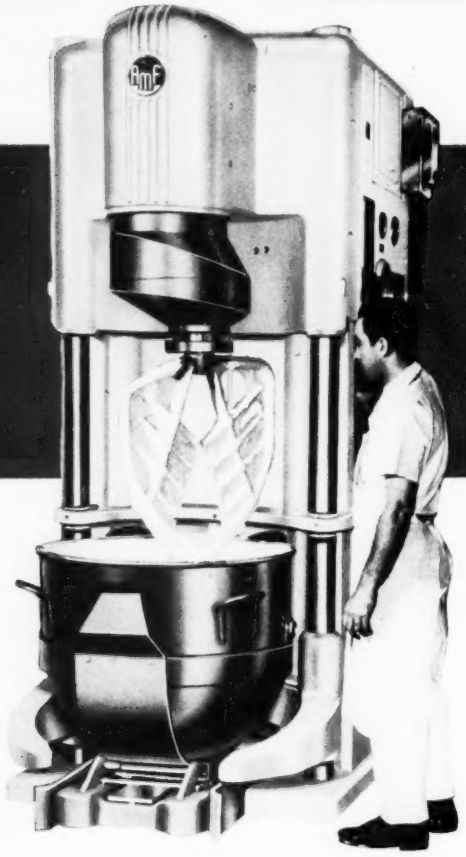

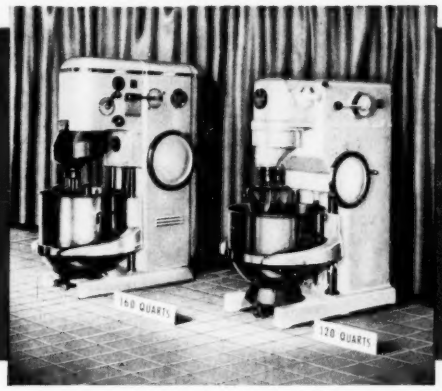

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All AMF Glen Mixers ... the big batch 340-quart mixer, the 120- and 160-quart capacity mixers ... are sanitary ... easy to clean and keep clean.

The Glen "340" is also available with dual-ratio for those applications requiring it.

The Glen meets every unloading requirement ... with bottom discharge gates, or floor-to-floor dumping, or the automatic Glen Bowl Unloader.

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- Union Pan-O-Mat and Other Dough Make-up Equipment
- Super Standard Wrapping Machine
- Benj. Franklin Dough Mixers
- Rose Candy Machines
- Oakes Continuous, Automatic Mixers
- Top Labeler with Imprinter
- Pretzel Making Machines

Write to Mr. A. N. Cona for literature and information on the machines that interest you.

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